Educational Courses

SPPH01

AAPM/RSNA Physics Tutorial for Residents: US

Saturday, Nov. 28 12:00PM - 2:00PM Location: E351

US PH

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.00

Participants
Thaddeus A. Wilson, PhD, Memphis, TN (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Provide an overview of MRI/Ultrasound technology, recent advances and trends for the future. 2) Make the session attractive to both the clinician, clinician educator, medical physicist and other associated radiological fields. 3) First session hour will be spent reviewing the concepts of the modality. 4) Second session hour will be spent discussing artifacts of the modality.

Sub-Events

SPPH01A Update in Ultrasound

Participants
Kai E. Thomenius, PhD, Niskayuna, NY (*Presenter*) Stockholder, General Electric Company; Research Consultant, Endra, Inc

LEARNING OBJECTIVES

View learning objectives on main course title.

SPPH01B Primer and Clinical Significance of Artifacts in Ultrasound

Participants
David M. Paushter, MD, Chicago, IL, (dpaushter@uchicago.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the basic principles of ultrasound imaging and Doppler. 2) Apply these principles to identify the causative factors producing common artifacts in ultrasound. 3) Recognize artifacts encountered in clinical practice. 4) Identify methods to prevent or minimize artifacts in clinical practice.

ABSTRACT

Medical ultrasound including imaging and Doppler requires an understanding of basic principles of sound formation, propogation and display. Artifacts are common in ultrasound, and it is critical to: a) avoid production of artifacts when possible, b) recognize artifacts during imaging and c) control or eliminate artificacts that may interfere with image interpretation. Topics to be covered in this session will focus on equipment malfunction or design, operator error, violation of assumptions and physical principles as causative factors in artifact production. Included will be review and presentation of select examples of artifacts related to ultrasound basic principles, including:Ultrasound imagingResolution, beam width,refraction, reverberation, comet tail, ringdown, multipath, side and grating lobes, speed error, range ambiguity and mirror image produced in ultrasound imaging.Doppler/Duplex SonographyGain, scale, Doppler angle, aliasing/range ambiguity, mirroring, wall filter, color assignment, color bleeding, twinkle artifact, tissue vibratio and mirroring. ,

URL

Active Handout:David M. Paushter

http://abstract.rsna.org/uploads/2015/15001982/SPPH01B.pdf

SPGW01

NIH Grantsmanship Workshop

Saturday, Nov. 28 1:00PM - 5:00PM Location: E253AB

RS

AMA PRA Category 1 Credits ™: 3.75
ARRT Category A+ Credits: 4.00

Participants
Gayle E. Woloschak, PhD, Chicago, IL (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Gain greater understanding of the NIH grants process: a. understand the process for preparing a research or training grant application. b. learn the elements of a competitive grant application. 2) Gain insight into the new features of the NIH review process. 3) View the review process in action through a mock study section.

Sub-Events

SPGW01A Welcome and Introductory Remarks

Participants
Gayle E. Woloschak, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPGW01B Preparing an R01 Research Application

Participants
Pratik Mukherjee, MD, PhD, San Francisco, CA (*Presenter*) Research Grant, General Electric Company; Medical Adivisory Board, General Electric Company;

LEARNING OBJECTIVES

View learning objectives under main course title.

SPGW01C Preparing K Awards

Participants
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Ruth C. Carlos, MD, MS - 2015 Honored Educator

SPGW01D Clinical Trials in Applications

Participants
Michael W. Vannier, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Active Handout:Michael Walter Vannier

http://abstract.rsna.org/uploads/2015/15004306/SPGW01D.pdf

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Michael W. Vannier, MD - 2015 Honored Educator

SPGW01E Program Perspectives

Participants
Antonio Sastre, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPGW01F The Process of Review

Participants
Gayle E. Woloschak, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPGW01G Questions to the Faculty

Participants
Gayle E. Woloschak, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPGW01H Summary and Evaluation Form

Participants
Gayle E. Woloschak, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPNI01

NIH SBIR/STTR Programs To Support Innovative Commercial Product Development By Small Businesses and Academic Partners

Saturday, Nov. 28 1:00PM - 5:00PM Location: E350

OT

AMA PRA Category 1 Credits ™: 4.00
ARRT Category A+ Credit: 0

Participants
Greg Evans, PhD, Rockville, MD (*Presenter*) Nothing to Disclose
Deepa Narayanan, MS, Rockville, MD (*Presenter*) Nothing to Disclose
Todd Merchak, Bethesda, MD (*Presenter*) Nothing to Disclose
Jennifer Shieh, PhD, Bethesda, MD, (nhlbi_sbir@mail.nih.gov) (*Presenter*) Nothing to Disclose
Chris Sasiela, PhD, Bethesda, MD, (chris.sasiela@nih.gov) (*Presenter*) Nothing to Disclose
Steve Flaim, PhD, Bethesda, MD (*Presenter*) Founder, CardioCreate, Inc; Director, CardioCreate, Inc; Stockholder, CardioCreate, Inc; Director, OncoFluor Inc; Stockholder, OncoFluor Inc; Director, Pivotal BioSciences, Inc; Stockholder, Pivotal BioSciences, Inc; Director, Leading BioSciences Inc; Stockholder, Leading BioSciences Inc; Director, AnaBios Corporation; Stockholder, AnaBios Corporation; Stockholder, InflammaGen, LLC; Stockholder, Verdezyne, Inc; Stockholder, Solulink, Inc; Spouse, Employee, Isis Pharmaceuticals, Inc
Ram Aiyar, PhD, MBA, Bethesda, MD (*Presenter*) Advisor, BeneVir BioPharm; Advisor, Corvidia Corporation

LEARNING OBJECTIVES

1) Gain understanding of the SBIR/STTR programs at NIH and the resources available to translate your technology into the clinic. 2) Learn how to develop a successful SBIR grant application. 3) Understand the importance of a commercialization strategy including regulatory pathway and/or investment and partnerships. 4) Learn more about non-funding resources available at NIH to help commercialize your technology.

Handout:Deepa Narayanan

http://abstract.rsna.org/uploads/2015/15019193/NCI SBIR Overview.pdf

Handout:

http://abstract.rsna.org/uploads/2015/15019193/NHLBI-SmallBusiness_Handout_RSNA.pdf

SPSP01

Diagnóstico Precoz por Imagen en la Población el CIR: Sesión del Colegio Interamericano de Radiología (CIR) en Español/Population based Preventive Imaging from CIR: Session of the Interamerican College of Radiology (CIR) in Spanish

Saturday, Nov. 28 1:00PM - 5:00PM Location: E451A

BR CH GI NR VA HP

AMA PRA Category 1 Credits ™: 3.75
ARRT Category A+ Credits: 4.00

Participants
Pablo R. Ros, MD, PhD, Cleveland, OH (*Moderator*) Medical Advisory Board, Koninklijke Philips NV; Medical Advisory Board, KLAS Enterprises LLC; Medical Advisory Committee, Oakstone Publishing; Departmental Research Grant, Siemens AG; Departmental Research Grant, Koninklijke Philips NV; Departmental Research Grant, Sectra AB; Departmental Research Grant, Toshiba Corporation
Miguel E. Stoopen, MD, Mexico City, Mexico (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the state-of-the-art of population based preventive imaging 2) To discuss preventive imaging approaches in all major organ systems and key pathologies, ranging from dementia, cardiovascular disease, colon, liver, lung and breast cancer 3) To illustrate the use of different imaging technologies in preventive imaging such as CT, MRI and ultrasound

Sub-Events

SPSP01A Introducción/Introduction

Participants
Dante R. Casale Menier, MD, Ciudad Juarez, Mexico (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSP01B Parte 1/Part 1

Participants

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSP01C Presentación de Ponentes/Panel Introduction

Participants
Pablo R. Ros, MD, PhD, Cleveland, OH (*Presenter*) Medical Advisory Board, Koninklijke Philips NV; Medical Advisory Board, KLAS Enterprises LLC; Medical Advisory Committee, Oakstone Publishing; Departmental Research Grant, Siemens AG; Departmental Research Grant, Koninklijke Philips NV; Departmental Research Grant, Sectra AB; Departmental Research Grant, Toshiba Corporation

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSP01D Colon: La Colonografía Virtual: ¿Un Método de Escrutinio en la Poblacion?/Colon: Virtual Colonography: A Population Screening Tool?

Participants
Jorge A. Soto, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Honored Educators

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Jorge A. Soto, MD - 2013 Honored Educator
Jorge A. Soto, MD - 2014 Honored Educator
Jorge A. Soto, MD - 2015 Honored Educator

SPSP01E Cardiovascular: Cribaje de Enfermedad Cardiovascular por Imagen Medica/Cardiovascular: Diagnostic Imaging in Cardiovascular Screening

Participants

Carlos S. Restrepo, MD, San Antonio, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Honored Educators

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Carlos S. Restrepo, MD - 2012 Honored Educator
Carlos S. Restrepo, MD - 2014 Honored Educator

SPSP01F Neurología: Diagnóstico Temprano de Demencias: ¿Dónde Estamos?/Neurology: Dementia Early Diagnosis: Where Are We?

Participants
Carlos Zamora, MD,PhD, Chapel Hill, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

Objetivos: 1) Comprender conceptos clínicos básicos para el diagnóstico de los síndromes principales de demencia. 2) Reconocer características anatómicas y metabólicas fundamentales de neuroimagen en los síndromes principales de demencia, con especial atención a enfermedad de Alzheimer. 3) Explorar direcciones futuras y desafíos para el diagnóstico temprano. Learning objectives: 1) Understand basic clinical concepts for the diagnosis of major dementia syndromes. 2) Recognize fundamental anatomic and metabolic neuroimaging features of major dementia syndromes, with special focus on Alzheimer's disease. 3) Explore future directions and challenges for early diagnosis.

SPSP01G Parte II/Part II

Participants

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSP01H Presentación de Ponetes/Panel Introduction

Participants
Miguel E. Stoopen, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSP01I Mama: Rol de la RM en el Cáncer de Mama en Mujeres de Alto Riesgo/Breast: Role of MR in High Risk Breast Cancer Patients

Participants
Linei A. Urban, Curitiba, Brazil (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSP01J Pulmón: TC de Cribaje en Cancer de Pulmon: ¿Debe Hacerse en Fumadores y Exfumadores?/Lung: Lung Cancer CT Screening: Should It Be Performed in Smokers and Former Smokers?

Participants
Claudio S. Silva Fuente-Alba, MD, MSc, Santiago, Chile, (csilvafa@alemana.cl) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSP01K Hígado: Cribaje del Hepatocarcinoma en Pacientes de Riesgo: ¿Cómo Hacerlo y a Quién Incluir?/Liver: Hepatocellular Carcinoma Screening in High Risk Patients: How and Whom?

Participants
Carmen Ayuso, MD,PhD, Barcelona, Spain, (cayuso@clinic.ub.es) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Definir la población en riesgo de desarrollar un carcinoma hepatocelular que debe ser incluida en un programa de cribado. 2) Analizar la mejor estrategia para llevar a cabo el cribado del hepatocarcinoma en la población en riesgo de padecerlo. 3) Discutir la conducta a seguir una vez que se detecta un nódulo hepático en pacientes incluidos en un programa de cribado.1) To define the population at risk of hepatocellular carcinoma to be included in a surveillance program. 2) To analyze the best strategy for

surveillance in patients at risk of hepatocellular carcinoma. 3) To discuss how to proceed when a liver ndule is detected in patients on surveillance

SPSP01L Comentarios Finales y Clausura/Closing Remarks

Participants
Dante R. Casale Menier, MD, Ciudad Juarez, Mexico (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPPH02

AAPM/RSNA Tutorial on Equipment Selection: MRI

Saturday, Nov. 28 2:15PM - 4:15PM Location: E351

MR PH

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.00

Participants
Thaddeus A. Wilson, PhD, Memphis, TN (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Provide an overview of MRI/Ultrasound technology, recent advances and trends for the future. 2) Make the session attractive to both the clinician, clinician educator, medical physicist and other associated radiological fields. 3) First session hour will be spent reviewing the concepts of the modality. 4) Second session hour will be spent discussing artifacts of the modality.

Sub-Events

SPPH02A Update in MRI

Participants
Edward F. Jackson, PhD, Madison, WI, (efjackson@wisc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Active Handout:Edward F. Jackson

http://abstract.rsna.org/uploads/2015/15001984/SPPH02A1.pdf

SPPH02B Primer and Clinical Significance of Artifacts in MRI

Participants
Timothy J. Carroll, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPOI11

Oncodiagnosis Panel: Hodgkin Lymphoma: Current Controversies

Sunday, Nov. 29 10:45AM - 12:15PM Location: E353C

OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Stephanie A. Terezakis, MD, Baltimore, MD (*Moderator*) Speaker, Elekta AB
Karen M. Winkfield, MD, PhD, Boston, MA, (kwinkfield@partners.org) (*Presenter*) Consultant, Novartis AG
Satish P. Shanbhag, MBBS, MPH, Baltimore, MD (*Presenter*) Nothing to Disclose
Steve Cho, MD, Madison, WI, (scho@uwhealth.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the role of computed tomography (CT) and positron emission tomography (PET)/CT in the management of patients with Hodgkin and non-Hodgkin lymphoma. 2) To review the new Lugano Classification:Recommendations for Initial Evaluation, Staging, and Response Assessment of Hodgkin and Non-Hodgkin Lymphoma. 3) To assess the limitations and potential of PET/CT and PET/MR in assessing lymphoma evaluation and treatment response.

ABSTRACT

FDG PET/CT and contrast-enhanced CT both play an important role in lymphoma, for initial evaluation, staging and assessing response to therapy. In this session we will review the current and evolving role of imaging in lymphoma and demonstrate how it guides therapy in this patient population. The limitations and future developments of PET imaging in the context of PET/CT and PET/MRI will be addressed and discussed.

URL

VSPD11

Pediatric Series: Neuro

Sunday, Nov. 29 10:45AM - 12:15PM Location: S100AB

NR MR PD

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

Participants
Robert C. McKinstry III, MD, PhD, Saint Louis, MO (*Moderator*) Travel support, Siemens AG Speaker, Siemens AG
Thierry Huisman, MD, Baltimore, MD (*Moderator*) Nothing to Disclose

Sub-Events

VSPD11-01 Malformations of Cortical Development

Sunday, Nov. 29 10:45AM - 11:05AM Location: S100AB

Participants
Robert C. McKinstry III, MD, PhD, Saint Louis, MO, (mckinstryb@mir.wustl.edu) (*Presenter*) Travel support, Siemens AG Speaker, Siemens AG

LEARNING OBJECTIVES

A radiologist attending this session will learn 1) The stages of cortical development. 2) The malformations associated with abnormal neuronal proliferation and/or apoptosis. 3) The malformations associated with abnormal neuronal migration. 4) Learn the malformations associated with abnormal postmigrational development

ABSTRACT

This presentation will review the stages of normal cerebral cortical development. Malformations of cortical development will be organized according to abnormal development at each stage: proliferation/apoptosis, migration, and postmigrational organization. Tubulinopathies (e.g., polymicrogyria) and defects in the mTOR pathway (e.g., Tuberous Sclerosis) will illustrate emerging knowledge tying genotype to endophenotype.

Active Handout:Robert C. McKinstry

http://abstract.rsna.org/uploads/2015/15002018/VSPD11-01.pdf

VSPD11-02 Comparison of Three Diffusion Models for Differentiating Low- and High-Grade Pediatric Brain Tumors

Sunday, Nov. 29 11:05AM - 11:15AM Location: S100AB

Participants
Muge Karaman, PhD, Chicago, IL (*Presenter*) Nothing to Disclose
Yi Sui, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
He Wang, PhD, Shangai, China (*Abstract Co-Author*) Nothing to Disclose
Frederick C. Damen, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Yu Hua Li, MD, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Xiaohong J. Zhou, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the performance of monoexponential, biexponential, and continuous time random walk (CTRW) diffusion models for differentiating low-grade (LG) and high-grade (HG) pediatric brain tumors.

METHOD AND MATERIALS

With IRB approval, 54 children (4 months to 13 years old) with brain tumors were enrolled in the study and underwent MRI scans at 3T. The imaging protocol included pre-/post-contrast T1, T2, FLAIR, and diffusion-weighted imaging with 12 b -values (0 to 4000 s/mm2). The parameters of the mono-exponential (apparent diffusion coefficient, D), biexponential (fast and slow diffusion coefficients, Df and Ds ; fast diffusion fraction, f) and CTRW (diffusion coefficient, Dm ; fractional powers of the waiting time and jump length, α and β) models were estimated from the diffusion data. Surgical biopsy or surgery was performed to determine the tumor grade histopathologically according to the WHO guidelines, resulting in 24 patients with LG and 30 with HG tumors. The mean values of all parameters over the tumor ROIs were compared between the two groups using a Mann-Whitney-Wilcoxon U-test. A k -means clustering algorithm was employed to differentiate LG and HG tumors based on the biexponential or CTRW parameters, followed by a comparison using histopathology as a reference.

RESULTS

Significant differences between the two tumor groups (LG vs. HG) were observed in the parameters of any of the three models with p-values < 0.001 (D :0.90±0.34 vs. 0.56±0.17 in monoexponential; Df: 2.6±1.1 vs. 1.8±0.5, Ds :0.58±0.1 vs. 0.31±0.1, f :0.73±0.11 vs. 0.59±0.09 in biexponential; Dm :1.5±0.5 vs. 0.75±0.2, α:0.95±0.04 vs. 0.90±0.03, β:0.92±0.07 vs. 0.81±0.06 in CTRW, with D 's in units of μm2/ms). The combination of CTRW parameters produced better accuracy (85% vs. 79%), sensitivity (87% vs. 83%), and specificity (83% vs. 75%) than the combination of biexponential parameters for identifying tumor grades. Both models outperformed the monoexponential model in accuracy (75%) and specificity (54%).

CONCLUSION

The CTRW diffusion model performed the best in determining pediatric brain tumor malignancy when compared with the monoexponential and biexponential models.

CLINICAL RELEVANCE/APPLICATION

The CTRW diffusion model can provide quantitative imaging markers to improve diagnosis of pediatric brain tumors.

VSPD11-03 Evaluation of Pediatric Intracranial Tumors with Intravoxel Incoherent Motion MR Imaging

Sunday, Nov. 29 11:15AM - 11:25AM Location: S100AB

Participants
Kazufumi Kikuchi, MD, Fukuoka, Japan (*Presenter*) Nothing to Disclose
Akio Hiwatashi, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Osamu Togao, MD, PhD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Koji Yamashita, MD, PhD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomoyuki Okuaki, RT, Chuo-Ku, Japan (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Hiroshi Honda, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Intravoxel incoherent motion (IVIM) is a non-invasive MR imaging technique to measure microcirculation and diffusivity simultaneously. The purpose of this study was to evaluate the utility of perfusion fraction (f) and diffusion coefficient (D) derived from IVIM to characterize pediatric intracranial tumors.

METHOD AND MATERIALS

This retrospective study included 16 children (M: F = 9: 7; age range 2 month-19 year-old, median 5 year). There were 6 high-grade tumors (HGTs; 3 anaplastic ependymoma, 1 glioblastoma, 1 medulloblastoma, and 1 atypical teratoid/rhabdoid tumor), 9 low-grade tumors (LGTs; 4 pilocytic astrocytoma, 2 craniopharyngioma, 1 diffuse astrocytoma, 1 choroid plexus papilloma, and 1 subependymoma) and 1 germinoma. IVIM imaging was obtained using single-shot SE-EPI sequence with 13 b-factors (0, 10, 20, 30, 50, 80, 100, 200, 300, 400, 600, 800, 1000 s/mm²). Other parameters of IVIM were as follows: TR/TE = 2500/70 ms, FA = 90, FOV = 230 x 230 mm², matrix = 128 x 126, slice thickness = 5 mm, slices = 11, average = 1. The signal equation: $S = S0 \cdot [(1-f) \exp(-bD) + f \exp(-BD^*)]$ was fitted to obtain f pixel-by-pixel. The f and D were measured in the three hot spot regions-of-interest in a tumor in each map. Histopathologic vascular density was measured in three microscopic fields (x200) of the most intense vascularization on CD-31-immunostainted histopathologic specimens. Statistical analysis was performed with the Pearson correlation coefficient and receiver operating characteristic (ROC). A p value less than .05 was considered significant.

RESULTS

The f-value (4.2-27.1%) significantly correlated (r = 0.72, P = 0.0018) with vascular density (0.60-13.4%). The f of HGTs (19.1±4.6%) was significantly higher than LGTs (7.7±4.0%; P = 0.0047). The D of HGTs (0.93±0.34 x 10^-3/mm²) was significantly lower than LGTs (1.70±0.34 x 10^-3/mm²; P = 0.0032). ROC analysis showed high Az values with f (0.94) and D (0.96) without a statistically significant difference (P = 0.74).

CONCLUSION

The f-value derived from IVIM significantly correlated with vascular density of pediatric brain tumors. Both f and D parameters could discriminate HGTs from LGTs.

CLINICAL RELEVANCE/APPLICATION

Using IVIM, we could simultaneously evaluate flow and diffusivity in pediatric brain tumors. The f-value derived from IVIM significantly correlated with vascular density. Both f and D could discriminate HGTs from LGTs.

VSPD11-04 rADC and Location Differ between Posterior Fossa Pilocytic Astrocytomas with and without Gangliocytic Differentiation

Sunday, Nov. 29 11:25AM - 11:35AM Location: S100AB

Participants
Julie Harreld, MD, Memphis, TN (*Presenter*) Nothing to Disclose
Scott N. Hwang, MD, PhD, Memphis, TN (*Abstract Co-Author*) Nothing to Disclose
Ibrahim Qaddoumi, MD, Memphis, TN (*Abstract Co-Author*) Nothing to Disclose
David W. Ellison, MD,PhD, Memphis, TN (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Pediatric gangiogliomas (GG) are rare (≤4% of pediatric brain tumors), and only ~5% of gangliogliomas occur in the posterior fossa. A recently defined GG variant, histopathologically resembling pilocytic astrocytoma but with focal gangliocytic differentiation (PA-GG) that can be overlooked, can be mistaken for the common pilocytic astrocytoma (PA). We investigated whether MRI features could differentiate posterior fossa PA-G from PA.

METHOD AND MATERIALS

Pre-operative MRIs (and CTs where available) of 42 children (3mo-15 years, mean 7.11±3.8 years; 57% male; 8 PA-GG, 34 PA) were evaluated by two neuroradiologists blinded to pathologic diagnosis for tumor location and gross morphology; presence of hemorrhage or calcification; circumscription; degree of enhancement, edema, and %cyst/necrosis; and minimum rADC (compared to thalamus). Data for PA-GG and PA were compared.

RESULTS

Location differed significantly between PAs and PA-Gs (Pearson ChiSquare, p=0.0194); 16/34 PAs, but no PA-GGs, were centered in the cerebellar hemisphere. All PA-GGs predominantly involved midline structures (vermis, medulla, midbrain), compared to 13 of 34 PAs. Minimum rADC was significantly lower in PA-GGs (mean 0.95±0.21; 95%CI 0.73, 1.17) than in PAs (mean 2.01±0.38; 95%CI 1.86,2.16) (p<.0001). 24/34 PAs and 1/8 PA-GGs had "cyst+nodule" morphology, 7/34 PAs and 4/8 PA-GGs had evidence of hemorrhage, with no statistically significant difference between these or the remaining evaluated features.

CONCLUSION

Minimum rADC and location appear to differ significantly between posterior fossa PAs with or without gangliocytic differentiation.

CLINICAL RELEVANCE/APPLICATION

For differentiation between posterior fossa PAs with and without gangliocytic differentiation, location and minimum rADC may be a useful adjunct to histopathologic diagnosis, which is subject to sampling error.

VSPD11-05 Systematic Comparison of MR Imaging Findings in Pediatric Ependymoblastoma with Ependymoma and CNS-PNET NOS

Sunday, Nov. 29 11:35AM - 11:45AM Location: S100AB

Participants
Johannes Nowak, MD, Wurzburg, Germany (*Presenter*) Nothing to Disclose
Carolin Seidel, Wurzburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Torsten Pietsch, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Balint Alkonyi, Wurzburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Taylor Laura Fuss, Charlestown, MA (*Abstract Co-Author*) Nothing to Disclose
Carsten Friedrich, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Katja von Hoff, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Stefan Rutkowski, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Monika Warmuth-Metz, Wurzburg, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Ependymoblastoma (EBL), ependymoma (EP), and primitive neuroectodermal tumors of the central nervous system (CNS-PNET NOS = not otherwise specified) are pediatric brain tumors that can be differentiated by histopathology in the clinical setting. Recently, we first described specific MRI features of EBL. In this study, we compare standardized MRI characteristics of EBL with EP and CNS-PNET NOS in a series comprising of 22 patients in each group.

METHOD AND MATERIALS

We systematically analyzed the initial cranial MRI scans at diagnosis according to 25 standardized criteria, and paired comparison was performed for EBL and EP, as well as for EBL and CNS-PNET NOS. All 66 cases of this multi-center study were centrally reviewed regarding histopathology, MR imaging and multimodal therapy.

RESULTS

We found differences between EBL and EP regarding age at diagnosis, MR signal intensity, tumor margin and surrounding edema, presence and size of cysts, and contrast enhancement pattern. Although MRI appearance of EBL shares many features with CNS-PNET NOS, we revealed significant differences in terms of age at diagnosis, tumor volume and localization, tumor margins, edema, and contrast enhancement.

CONCLUSION

We systematically analyze and compare MRI characteristics of pediatric EBL with EP and CNS-PNET NOS in a series of 22 centrally reviewed cases of each group. A definite differentiation of these entities with MRI seems to be difficult; however, we identify particular imaging features that might help distinguishing these histologically distinct tumor types.

CLINICAL RELEVANCE/APPLICATION

This is the first study that systematically compares multiple parameters of MR imaging in pediatric EBL with findings in EP and CNS-PNET NOS. Since EBL is very rare, our data provides important information that might help differentiating EBL from other pediatric brain tumor entities in the clinical setting.

VSPD11-06 Quantitative Approach to the Posterior Cranial Fossa and Cranio-cervical Junction in Asymptomatic Children with Achondroplasia

Sunday, Nov. 29 11:45AM - 11:55AM Location: S100AB

Participants
Rosalinda Calandrelli, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Marco Panfili, MD, Rome, Italy (*Presenter*) Nothing to Disclose
Gabriella D'Apolito, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Giuseppe M. Di Lella, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Cesare Colosimo, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Achondroplasia, the best-known form of congenital dwarfism, is caused by a disturbance of endochondral bone formation. We proposed a MRI-based quantitative morpho-volumetric approach to the posterior cranial fossa and cranio-cervical junction to understand posterior cranial fossa changes responsible of ventriculomegaly and life-threatening medullary compression.

METHOD AND MATERIALS

We analyzed brain MRI of 12 children with a diagnosis of achondroplasia (mean age 39 + 16 months) and no surgical treatment. 3DFSPGR T1weighted images were used for1)evaluation of the posterior fossa synchondroses;2)volumetric analysis of the posterior fossa (posterior cranial fossa volume=PCFV, posterior cranial fossa brain volume=PCFBV, PCFV/PCFBV ratio, hemispheres'cerebellar volume=Ce.V, cerebellar vermis volume=Ve.V, brainstem volume, CSF spaces volume, IV ventricle volume);3)morphometric analysis of the posterior fossa (clivus, supraocciput, exocciput lengths, tonsillar herniation, tentorial angle) and cranio-cervical junction (A-P and LL diameters of the foramen magnum);4)measurements of foramen magnum and jugular foramina areas;5) volumetric analysis of supratentorial ventricles.These patients were compared with age-matched control group.

RESULTS

All patients showed synostosis of spheno-occipital synchondroses while six patients showed synostosis of anterior and posterior

intra-occipital synchondroses, cervical myelopathy without swelling cord.Compared to control group, clivus and exocciput lengths, L-L and A-P diameters of the foramen magnum, foramen magnum area and jugular foramina area were significantly reduced; supraocciput length, tentorial angle, PCFV, PCFBV, CeV , Ve, brainstem volume and supratentorial ventricular system volume were significantly increased($p<0.05$) while PCFV/PCFBV ratio, the subarachnoid spaces volume of the PCF and IV ventricle volume were not significant ($p>0.05$).

CONCLUSION

The quantitative approach to the posterior fossa and cranio-cervical junction modifications shows a complex relationship among the maldevelopment of the posterior cranial fossa, the foramen magnum stenosis, the development of ventriculomegaly and medullary compression.

CLINICAL RELEVANCE/APPLICATION

Posterior cranial fossa changes and foramen magnum stenosis should be evaluated together to the status of synchondroses in order to plan the prophylactic cervicomedullary decompression.

VSPD11-07 Congenital Spine Anomalies: Diagnosis and Classification

Sunday, Nov. 29 11:55AM - 12:15PM Location: S100AB

Participants
Erin S. Schwartz, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the embryologic derangements behind the more common congenital spinal anomalies encountered in clinical practice.
2) Be able to apply a clinical-radiological classification to facilitate the interpretation of imaging studies of patients with spinal dysraphism.

ABSTRACT

Encouraging imaging studies on patients with congenital spinal anomalies can be intimidating for radiologists, particularly when pediatric imaging and/or neuroimaging are not a large part of your practice. A clinical-radiological classification system developed by Tortori-Donoti, et al (Neuroradiology, 2000), remains a valuable approach to correctly diagnosing these children, largely dividing entities into open or closed spinal dysraphism based on the absence or presence of overlying skin, respectively. Closed spinal dysraphism is further subdivided into those lesions that present with a subcutaneous mass versus does that do not. Lesions without a subcutaneous mass can be further subdivided into simple and complex, and may be associated with other cutaneous stigmata such as hemangioma, skin dimple, and/or focal hairy patch.

RCA11

Data Collection, Organization and Analysis with Excel - A Hands-On Tutorial (Hands-on)

Sunday, Nov. 29 11:00AM - 12:30PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Jaydev K. Dave, PhD, MS, Philadelphia, PA, (jaydev.dave@jefferson.edu) (*Presenter*) Nothing to Disclose
Raja Gali, MS, Philadelphia, PA (*Presenter*) Nothing to Disclose
Manish Dhyani, MBBS, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe techniques for creating a spreadsheet to allow trouble-free data analysis. 2) Demonstrate key data management skills. 3) Describe tools for performing basic descriptive statistics. 4) Identify how to perform simple statistical tests and perform these tests with a sample dataset. 5) Understand how bad data (or bad data acquisition techniques) may corrupt subsequent data analyses. 6) Practice data plotting/representation techniques. 7) Identify differences between a spreadsheet and a database. 8) Identify statistical tasks that require more sophisticated software. Pre-requisites: Familiarity with Microsoft Windows and Microsoft Excel environment will be assumed

ABSTRACT

A spreadsheet program is commonly employed to collect and organize data for practicing quality improvement, for research, and for other purposes. In this refresher course, we will demonstrate to a user, familiar with Microsoft Excel environment, how this spreadsheet program may be used for such purposes. The course will begin with describing efficient approach for data acquisition and highlight key data management skills; and with reviewing commons errors that may be avoided during data logging. Then we will provide a brief introduction on basic descriptive tests before proceeding with a hands-on tutorial using a sample dataset to calculate basic descriptive statistics, and to perform basic statistical tests like t-test, chi-square test, correlation analysis, etc. Effect of corrupted data on such analysis will also be demonstrated. The final hands-on component for this course will include data plotting and representation including the use of pivot tables. The course will conclude with a discussion on identifying differences between a spreadsheet and a database, limitations of a spreadsheet program and avenues where a dedicated statistical software program would be more beneficial. A list of some of these dedicated statistical software programs for analyses will also be provided.Pre-requisites:Familiarity with Microsoft Windows and Microsoft Excel environment will be assumed

RCB11

Basic DICOM with Horos/Osirix and dcm4che (Hands-on)

Sunday, Nov. 29 11:00AM - 12:30PM Location: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Marc D. Kohli, MD, San Francisco, CA (*Presenter*) Research Grant, Siemens AG
Simon Rascovsky, MD, MSc, Bogota, Colombia (*Presenter*) Officer, eDx Tecnologia en Salud SAS

LEARNING OBJECTIVES

1) Describe basic DICOM object metadata structure. 2) Demonstrate familiarity with Osirix/Horos DICOM viewer functions including image display, and measurements. 3) Use Osirix/Horos to send/receive DICOM objects. 4) Name several common dcm4che toolkit tools, and describe their purpose.

RCC11

Principles and Practice of 3D Printing

Sunday, Nov. 29 11:00AM - 12:30PM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Moderator*) Research Grant, Toshiba Corporation;
Jonathan M. Morris, MD, Rochester, MN (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the basics of 3D printing technologies. 2) Discuss how these can be used clinically. 3) Discuss the current limitations of this technology as it relates to health care. 4) Use case examples to define current uses of this technology in surgical and medical specialties.

ABSTRACT

3D printing/additive manufacturing is a growing industry. Within the medical field there is growing interest in this technology and its impact on patients lives. In this talk we will discuss the basics of 3D printing and how they can be incorporated into medical uses from surgical design of implants to anatomic modeling of complex surgery.

Sub-Events

RCC11A 3D Printing for the Radiologist: A Primer and Introduction to Sessions

Participants
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Research Grant, Toshiba Corporation;

LEARNING OBJECTIVES

1) To become familiar with 3D printing technologies. 2) To have an introduction of materials used to create 3D-printed anatomical models and how they can be used in medical applications. 3) To be exposed to the process of 3D printing and those realized and potential clinical benefits in radiology, stratified by organ section.

ABSTRACT

While advanced visualization in radiology is instrumental for diagnoses and communication with referring clinicians, there is an unmet need to render DICOM images as three-dimensional (3D) printed models capable of providing both tactile feedback and tangible depth information of both anatomic and pathologic states. 3D printed models, already entrenched in the non-medical sciences, are being rapidly embraced in medicine as well as in the lay community. Incorporating 3D printing from images generated and interpreted by radiologists presents particular challenges including training, materials and equipment, and guidelines. The overall costs of a 3D printing lab must be balanced by clinical benefits. The RSNA 2015 program includes 6 hours of didactic lectures that review and summarize numerous studies that support such benefits from 3D printing, as it is expected that the number of 3D printed models generated from DICOM images for planning intervention and fabricating implants will grow exponentially. The program also includes multiple hands-on courses that will enable radiologists, at a minimum, to become familiar with 3D printing software and hardware as it relates to our field.

RCC11B 3D Printing Technologies

Participants
Peter C. Liacouras, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the basic principle of Additive Manufacturing (3D Printing) and how it differs from subtractive technology. 2) Understand the principles of the software needed to convert Medical Images into three-dimensional printed models and what factors contribute to the quality of each model. 3) Become familiar with the different types of Additive Manufacturing (3D Printing) technologies.

ABSTRACT

This presentation will provide a novice to Additive Manufacturing the general knowledge applicable to the medical field. The basic principles of Additive manufacturing (3D Printing) will be discussed along with the different technologies which encompass the field. The steps of converting radiographic images into three-dimensional printable files and the differences between the multitude of additive manufacturing techniques will be the primary focuses.

RCC11C Techniques for Current 3D Printing

Participants
Gerald T. Grant, MD, MS, Louisville, KY (*Presenter*) Nothing to Disclose

RCC11D 3D Printing Software

Participants
Andreas Giannopoulos, MD, Boston, MA, (agiannopoulos1@partners.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To become familiar with common 3D printing software terminology and software capabilities. 2) To be acquainted with the line of software needed in transforming medical images to 3D printable files. 3) To appreciate the implementation of 3D printing software in everyday clinical practice.

ABSTRACT

3D printers cannot recognize DICOM images and further steps are necessary to make DICOMs readable by 3D printers. While adequately trained personnel can perform many of those steps, the role of the radiologist is essential to ensure that the model will be clinically useful. A variety of software packages for STL generation from medical imaging as well as software for 3D part manipulation, known as Computer-Aided Design (CAD), will be discussed. Basic technical terminology and commonly used techniques will be presented. Real life paradigms from own medical 3D printing experience will be provided.

RCC11E 3D Printing with Open Source Freeware

Participants
Michael W. Itagaki, MD, MBA, Seattle, WA (*Presenter*) Owner, Embodi3D, LLC

LEARNING OBJECTIVES

1) To become familiar with the steps of converting a medical imaging scan in standard Digital Imaging and Communications in Medicine (DICOM) format into a 3D printable medical model. 2) To become familiar with the free, open-source software packages that can perform each step.

ABSTRACT

This presentation will provide an overview of the basic steps of converting a medical scan into a 3D printed medical model, using free, open-source software for each required step. Conversion of computed tomography image data in Digital Imaging and Communications in Medicine (DICOM) format to stereolithography (STL) file format using the open-source software package 3D Slicer will be reviewed. Further manipulation of the STL file in preparation for 3D printing using the open-source software package Blender will also be discussed.

Active Handout:Michael Ward Itagaki

http://abstract.rsna.org/uploads/2015/15002970/RCC11E.pdf

RCC11F Implementing 3D Printing into a Clinical Practice

Participants
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose

ABSTRACT

3D printing/additive manufacturing is a growing industry. Within the medical field there is growing interest in this technology and its impact on patients lives. In this talk we will discuss how we incorporated this technology into a quaternary referral center as a real time clinical service. We will specifically discuss the advantages as well as limitations of this technology as it relates to the medical/surgical field. We will discuss "How we do it" and what resources are needed to develop a service. As the impact of this technology is growing we will also discuss what evidence will we need to have global acceptance as a clinical service and why it should be housed in radiology.

VSIO11

Interventional Oncology Series: Percutaneous Management of Renal Tumors: Updates and Ongoing Controversies in 2015

Sunday, Nov. 29 1:30PM - 6:00PM Location: S405AB

GU IR OI RO

AMA PRA Category 1 Credits ™: 4.25
ARRT Category A+ Credits: 5.00

FDA Discussions may include off-label uses.

Participants
Debra A. Gervais, MD, Chestnut Hill, MA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review management options for small renal masses as well as indications for each. 2) To review the data supporting the energy based thermal ablation modalities for ablation of renal masses. 3) To describe the role and limitations of biopsy of renal masses. 4) To review the management of benign solid renal masses. 5) To describe the evidence for ablation of T1b renal masses.

Sub-Events

VSIO11-01 Updates in the Management of Small (T1a) Renal Masses: Resect, Ablate, or Follow?

Participants

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO11-02 Small Renal Mass (T1a): The Case for Ablation in 2015

Sunday, Nov. 29 1:30PM - 1:50PM Location: S405AB

Participants
Jeremy C. Durack, MD, New York, NY (*Presenter*) Scientific Advisory Board, Adient Medical Inc Investor, Adient Medical Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO11-03 Small Renal Mass (T1a): The Case for Resection in 2015

Sunday, Nov. 29 1:50PM - 2:10PM Location: S405AB

Participants
Adam S. Feldman, MD, Boston, MA (*Presenter*) Consultant, Olympus Corporation

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO11-04 Small Renal Mass (T1a): Both Cases for Intervention are Weak. Active Surveillance Will Do Just as Well

Sunday, Nov. 29 2:10PM - 2:30PM Location: S405AB

Participants
Stuart G. Silverman, MD, Brookline, MA, (sgsilverman@partners.org) (*Presenter*) Author, Wolters Kluwer nv

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO11-05 Age Impacts Choice of Partial Nephrectomy vs. Percutaneous Ablation for Stage T1a Renal Cell Carcinoma: a Surveillance, Epidemiology and End Results (SEER)-Medicare Population Study

Sunday, Nov. 29 2:30PM - 2:40PM Location: S405AB

Participants
Minzhi Xing, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Nima Kokabi, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Di Zhang, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Hyun S. Kim, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate survival outcomes in patients with stage 1a renal cell carcinoma (RCC) undergoing open or laparoscopic partial nephrectomy (PN) vs. percutaneous cryoablation (CRA) or radiofrequency ablation (RFA) in a large-scale population study.

METHOD AND MATERIALS

The most recently updated SEER-Medicare linked database was queried for patients with T1aN0M0 RCC (≤4cm, ICD-O-3 C64.9)

The most recently updated SEER-Medicare linked database was queried for patients with T1aN0M0 RCC (≤4cm, ICD-O-3 C64.9) diagnosed between 2000 and 2011 and followed to 2012. Patients who underwent therapy were selected from Medicare via CPT carrier claim codes (percutaneous RFA 50592; percutaneous CRA 50593; open PN 50240; laparoscopic PN 50543). Mean overall survival (OS) from therapy was compared between patients who underwent percutaneous ablation vs. partial nephrectomy, with subgroup survival analysis of individual therapies. Kaplan-Meier estimation and Cox proportional hazard models were used for survival analyses and to assess independent prognostic factors for OS.

RESULTS

A total of 5,983 T1a RCC patients underwent percutaneous ablation or PN within the study period, median age 72.0 yrs, 61.0% male. Of these, 3150 received open PN, 1785 received laparoscopic PN, 419 received CRA and 629 received RFA. Of these, 47.9% of patients undergoing PN were >72 yrs, vs. 67.1% of patients in the ablation group. Mean age of patients receiving ablation was significantly higher than that of the PN group, 80.1 vs. 70.6 yrs, p<0.001. Other factors including gender, ethnicity, mean index tumor size and tumor grade were not significantly different between comparison groups. Patients who underwent PN had significantly higher mean OS compared to the ablation group, 128.7 vs. 75.5 months, p<.001. On Cox regression analysis, younger age was the only independent prognostic factor for survival, HR 0.91 (0.87-0.93, p<0.001).

CONCLUSION

In T1aN0M0 RCC, patients undergoing ablation were significantly older compared to PN patients. Age was found to be an independent prognostic factor for survival from treatment.

CLINICAL RELEVANCE/APPLICATION

In T1aN0M0 RCC, age was found to be an independent prognostic factor for survival from treatment and may impact choice of therapy.

VSIO11-06 Ablation for Renal Cell Carcinoma: Radiofrequency, Cryoblation, or Microwave?

Participants

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO11-07 Small Renal Mass (T1a): The Case for RFA in 2015

Sunday, Nov. 29 2:40PM - 3:00PM Location: S405AB

Participants
Debra A. Gervais, MD, Chestnut Hill, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Debra A. Gervais, MD - 2012 Honored Educator

VSIO11-08 US-guided Percutaneus Radiofrequency Ablation of Renal Cell Carcinoma: Experience from Treating 120 Renal Masses Over 7 Years

Sunday, Nov. 29 3:00PM - 3:10PM Location: S405AB

Participants
Adriana C. Montealegre Angarita, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Xavier Serres Creixams, PhD, Barcelona, Spain (*Presenter*) Nothing to Disclose
Enrique Trilla, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Milton R. Villa III, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Juan Halaburda Berni, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Esteban Ramirez Pinto, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Xavier G. Azogue JR, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Evaluate the efficacy and safet of ultrasound (US) guided percutaneous radiofrequency ablation (RFA) for small renal masses. Describe the complications of RFA guided by US. Evaluate the technique in their initial ablative capacity and rate of tumor recurrence at one year minimum follow up. Illustrate postablation findings of residual or recurrent renal tumor by using Contrast-enhanced US (CEUS) Evaluate the effect of renal function in patients undergoing RFA guided by US

METHOD AND MATERIALS

Over a 7 year 105 patients with 120 renal masses (tumor size averaged 2.7 cm) were reviewed treated with US-guided percutaneous RFA. Biopsy was performed at the same moment of the procedure from 2009. Cool-tip RFA system was percutaneously inserted under ultrasound guidance. RF was emitted at 100-120 W for 12 minutes to attain temperatures sufficient to ensure tumor kill. The treatment response and technical success were defined by absence of contrast enhancement within the tumor on contrast enhanced CT and CEUS. The patients were followed up with CEUS and computed tomography at 3.6 months and every 6 months thereafter. Multivariate analysis was performed to determine variables associated with procedural outcome.

RESULTS

Follow-up ranged from 24 months to 84 months.The initial treatment success rate was 95.8%.Five of the remaining tumors were successfully re-treated.Four tumors had recurrence (defined as the occurrence of contrast enhancing tumor 12 months after complete ablation) three of whom required a second ablation and one nephrectomy.The overall technical success rate was 99%. Complications were seven self-limited included hematomas subcapsular or perirenal. In all 104 (99%) patients have preservation of renal function,only one patient developed significant renal function deterioration associated with perirenal hematoma. There were no bowel complications despite the fact that 6 of the tumors were within 1 cm of bowel. Protective strategies progressed from reliance on electrode positioning to hydro dissection.

CONCLUSION

Our experience to date suggests that US-guided RFA of small renal tumors is a safe and effective, minimally invasive technique in selected patients.

CLINICAL RELEVANCE/APPLICATION

US-guided RFA of renal tumors can provide benefits compared to other techniques: Intraprocedural monitoring affords visualization of the forming hot ball, helps detect proximity to surrounding structures and does not use ionizing radiation.

VSIO11-09 Small Renal Mass (T1a): The Case for Cryoblation

Sunday, Nov. 29 3:10PM - 3:30PM Location: S405AB

Participants
Peter J. Littrup, MD, Providence, RI (*Presenter*) Founder, CryoMedix, LLC; Research Grant, Galil Medical Ltd; Research Grant, Endo Health Solutions Inc; Consultant, Delphinus Medical Technologies, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Cryoablation of smaller renal cancers (i.e., T1a, or <4 cm) is an out-patient treatment that is safe, effective and flexibility for nearly any renal location. Major cryoablation benefits include its excellent visualization of ablation zone extent, low procedure pain and flexible protection of tumor ablation sites near calyces, bowel and ureter. CT-guidance is the cryoablation guidance modality of choice due to circumferential visualization of low density ice and ready availability. US-guidance can augment renal cryoablation, especially for smaller visible masses and/or placement of interstitial metallic markers during biopsy for selected cases requiring better eventual CT localization. MR-guidance has little clinical benefit or cost-efficacy. For safety, cases will be considered for avoidance of direct calyceal puncture, selection of hydrodissection or balloon interposition for bowel protection, and protection of the uretero-pelvic junction by stent placement. Imaging outcomes of complications and their avoidance will be shown. For optimal efficacy, tumor size in relation to number and size of cryoprobes emphasize the "1-2 Rule" of at least 1 cryoprobe per cm of tumor diameter and no further than 1 cm from tumor margin, as well as cryoprobe spacing of <2cm. Thorough extent of visible cryoablation margins beyond all apparent tumor margins produces very low local recurrence rates for tumors in nearly any renal location, resulting in excellent cost-efficacy by minimizing the need for re-treatments.

VSIO11-10 Adjunctive Techniques to Improve Image-Guided Percutaneous Cyroablation of Renal Masses in Difficult Anatomic Locations: Quantifying Procedural Success and Long-term Outcomes

Sunday, Nov. 29 3:30PM - 3:40PM Location: S405AB

Participants
Ahmed Fadl, MD, Mineola, NY (*Presenter*) Nothing to Disclose
Andrew Ho, Bayside, NY (*Abstract Co-Author*) Nothing to Disclose
Samia Sayegh, DO, Mineola, NY (*Abstract Co-Author*) Nothing to Disclose
April Griffith, Mineola, NY (*Abstract Co-Author*) Nothing to Disclose
Siavash Behbahani, MD, Mineola, NY (*Abstract Co-Author*) Nothing to Disclose
Jason C. Hoffmann, MD, Mineola, NY (*Abstract Co-Author*) Consultant, Merit Medical Systems, Inc; Speakers Bureau, Merit Medical Systems, Inc

PURPOSE

When performing renal mass cryoablation in difficult anatomic locations, adjunctive techniques such as retrograde pyeloperfusion, hydrodissection, and angioplasty balloon interposition can improve safety and technical success rates. Prior studies have reported the technical success of these techniques, but correlation with longer-term outcomes has not been reported in this specific patient population. This study quantifies the success of these techniques, and correlates with long-term cross-sectional imaging outcomes.

METHOD AND MATERIALS

Retrospective analysis of percutaneous renal mass cryoablation was performed from September 2011 through October 2014 at a single, tertiary care institution. Cases using adjunctive techniques were analyzed. The diagnostic cross sectional imaging, procedural images and report, and follow-up multi-phasic cross-sectional imaging were reviewed by one radiology resident and one interventional radiology attending. The type of adjunctive technique used, reason for such utilization, and procedural outcome of the technique were recorded. Specifically, in cases of hydrodissection or balloon angioplasty interposition, measurements of the displacement distance were made. Minor and major complications were recorded, per Society of Interventional Radiology criteria. Longer-term outcomes were evaluated by review of follow-up cross-sectional imaging.

RESULTS

Out of 53 cryoablations during the study period, 9 utilized adjunctive techniques, including hydrodissection (n=8), retrograde pyeloperfusion (n=1), and angioplasty balloon interposition (n=1). Median greatest tumor dimension was 1.9cm (range 1.3-3.5cm). Prior to adjunctive technique, median tumor proximity to closest organ was 0.4cm (range 0.1-1.3cm). After technique was used, median distance to closest organ was 2.8cm (range 0.3-3.3cm). One hydrodissection was unsuccessful, thus angioplasty balloon interposition was then performed. All cases had appropriate ablation zones and protection of adjacent critical structures. No minor or major complications were reported. No patients had evidence of residual or recurrent tumor on follow-up imaging, ranging from 3 to 30 months.

CONCLUSION

Adjunctive techniques to allow cryoablation of renal masses in difficult anatomic locations have excellent technical success rates and long-term outcomes.

CLINICAL RELEVANCE/APPLICATION

Improving outcomes of difficult renal mass cryoablations.

VSIO11-11 Small Renal Mass (T1a): The Case for Microwave

Sunday, Nov. 29 3:40PM - 4:00PM Location: S405AB

Participants
Fred T. Lee JR, MD, Madison, WI (*Presenter*) Stockholder, NeuWave Medical, Inc; Patent holder, NeuWave Medical, Inc; Board of Directors, NeuWave Medical, Inc ; Patent holder, Medtronic, Inc; Inventor, Medtronic, Inc; Royalties, Medtronic, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO11-12 Long-term Clinical Outcomes Following Radiofrequency and Microwave Ablation of Renal Cell Carcinoma at a Single Large VA Medical Center

Sunday, Nov. 29 4:00PM - 4:10PM Location: S405AB

Participants
Salim E. Abboud, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Tanay Y. Patel, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Stephanie Soriano, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Nannette Alvarado, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Preet S. Kang, MD, Pepper Pike, OH (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Earlier detection and a desire to preserve renal function and decrease surgical morbidity in the treatment renal cell carcinoma (RCC) has prompted increased use of percutaneous thermal ablation treatments such as radiofrequency ablation (RFA) and more recently microwave ablation (MWA). MWA has the potential to provide more complete ablation compared to RFA in part due to more uniform and higher intra-tumoral temperatures, but only a few small studies have examined the short-and long-term outcomes of MWA for RCC. This retrospective review assesses the experience and technical short- and long-term success rates of using RFA and MWA for RCC at a large VA medical center.

METHOD AND MATERIALS

Patient and tumor characteristics (tumor size, nearness to collecting system, anterior/posterior location, location relative to polar line, and endophytic/exophytic predominance) were tabulated using descriptive statistics. Group comparisons were performed by using univariate logistic regression analysis to determine factors impacting primary efficacy, secondary efficacy, and technique effectiveness. Kaplan-Meier local tumor progression-free survival following ablation was calculated.

RESULTS

71 patients with 78 renal lesions underwent ablation. Mean, primary, and secondary mean follow-up were 35.1, 33.5, and 31.3 months. Total, primary, and secondary technique effectiveness rates were 86%, 82%, and 4%, respectively. Primary efficacy and total technique effectiveness were associated with size, with p values of 0.02 and 0.001. There was no significant difference in survival curves between MWA and RFA treated patients. MWA and RFA groups were not significantly different in terms of age, BMI, or tumor size. Complications occurred in 11.5% of patients, none resulting in death. More than 90% patients were done as outpatients (sent home day of procedure) with moderate sedation. No cases used intubations or general anesthesia.

CONCLUSION

RFA and MWA both represent effective treatment modalities for RCC. Longer follow-up time and larger tumor size may be associated with the somewhat lower effectiveness rates; the comparable efficacy/complication rates compared to prior ablation studies demonstrate the feasibility of performing ablations on an outpatient basis.

CLINICAL RELEVANCE/APPLICATION

Image guided percutaneous ablation is an effective and cost-effective treatment modality for RCC in patients that are not surgical candidates.

VSIO11-13 To Biopsy or Not Biopsy the Small Renal Mass before Ablation? That Is the Question

Participants

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Characterization of small renal masses has proven challenging. However, with appropriate CT and MR protocols, the majority of these lesions can now be characterized pre procedurally, enabling a confident diagnosis. In this lecture, we will describe renal mass characterization protocols and describe the common imaging signatures of RCC subtypes and their common mimics including lipid poor AML and oncocytoma. This may eliminate need for preprocedural biopsy.

VSIO11-14 Biopsy or No Biopsy Before Ablation? Biopsy Every Renal Mass before Percutaneous Ablation

Sunday, Nov. 29 4:30PM - 4:50PM Location: S405AB

Participants
William W. Mayo-Smith, MD, Boston, MA (*Presenter*) Author with royalties, Reed Elsevier; Author with royalties, Cambridge University Press

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO11-15 Biopsy or No Biopsy before Ablation? Don't Trouble Yourself or the Patient with the Renal Mass Biopsy - Imaging Diagnosis Will Do Just as Well in 2015

Sunday, Nov. 29 4:50PM - 5:10PM Location: S405AB

Participants
Steven S. Raman, MD, Santa Monica, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO11-16 Thermal Ablation of a Confluent Lesion in the Porcine Kidney with Magnetic Resonance Guided High Intensity Focused Ultrasound (MR-HIFU)

Sunday, Nov. 29 5:10PM - 5:20PM Location: S405AB

Participants
Johanna M. van Breugel, MSc, Utrecht, Netherlands (*Presenter*) Nothing to Disclose
Martijn de Greef, PhD, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Joost W Wijlemans, MD,PhD, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Gerald Schubert, PhD, Vantaa, Finland (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Chrit T. Moonen, PhD, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Maurice V. Bosch, MD, PhD, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Mario G Ries, PhD, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate if MR-HIFU can provide for a reliable confluent volumetric lesion in the renal cortex in a clinically relevant time-frame in a porcine study.

METHOD AND MATERIALS

Nine anesthetized pigs were placed on a clinical Philips Sonalleve MR-HIFU therapy system integrated with a 1.5T Achieva MRI. Both acoustic energy delivery and MR-thermometry were respiratory gated and active surface cooling was employed to prevent near-field damage. A honeycomb pattern of at least seven ablation cells (9-25s, 450W acoustic power, 4x4x10 mm3 per cell) were positioned in the cortex of the kidney. The therapeutic endpoint was evaluated by a non-perfused volume (NPV) measurement using DCE-MRI. Subsequently, the animal was euthanized and the extent of induced necrosis was examined using a cellular viability staining (NADH).

RESULTS

Confluent volumes on NPV-imaging (up ~3 mL) and NADH staining (up to ~4mL) were obtained and temperatures exceeding 60°C were reached in 6 pigs. I.e. heating of the false rib, poor respiratory correction, and a large incidence angle caused poor kidney heating in 3 pigs.

CONCLUSION

These first results indicate that current clinical MR-HIFU equipment might be suitable for non-invasive therapy of renal masses. Positioning of the sonications and the subject based on anatomical scans is very important, as well as adequate motion compensation. Future work will include a first clinical study on renal cell carcinomas.

CLINICAL RELEVANCE/APPLICATION

There is an increasing interest in non-invasive kidney sparing therapy for renal cancer, since ~1.6% of men and women will be diagnosed with kidney and renal pelvis cancer during their lifetime, in 25% of all abdominal imaging sessions a renal lesion is found, partial nephrectomy - standard care for tumors <4cm - has a 15% complication rate, and the population is aging and known with comorbidities and poor physical condition. Therefore, several patient studies investigated the feasibility of HIFU for the thermal ablation of renal masses. Mainly a hand-held extracorporeal ultrasound device with US B-mode imaging for guidance or a laparoscopic approach was used. Disadvantages are i.e. the lack of respiratory motion compensation, no real-time visualization of energy deposition, and the complexity of the probe positioning. Alternatively, feasibility of MR-HIFU interventions on the kidney with respect to motion compensated real-time thermometry and acoustic energy delivery was established, recently.

VSIO11-17 Outside the Box: Is Ablation Effective for Masses other than T1a RCC

Participants

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO11-18 Percutantous Ablation for T1b Tumors

Sunday, Nov. 29 5:20PM - 5:40PM Location: S405AB

Participants
Thomas D. Atwell, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO11-19 Percutantous Ablation for Angiomyolipomas

Sunday, Nov. 29 5:40PM - 6:00PM Location: S405AB

Participants
Fred T. Lee JR, MD, Madison, WI (*Presenter*) Stockholder, NeuWave Medical, Inc; Patent holder, NeuWave Medical, Inc; Board of Directors, NeuWave Medical, Inc ; Patent holder, Medtronic, Inc; Inventor, Medtronic, Inc; Royalties, Medtronic, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

RC101

Imaging of Pulmonary Fibrosis

Sunday, Nov. 29 2:00PM - 3:30PM Location: E451B

CH CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
David A. Lynch, MBBCh, Denver, CO (*Moderator*) Research support, Siemens AG; Scientific Advisor, PAREXEL International Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Gilead Sciences, Inc; Consultant, F. Hoffmann-La Roche Ltd; Consultant, Veracyte, Inc;

LEARNING OBJECTIVES

1) Understand the current clinical approach to diagnosis and management of pulmonary fibrosis. 2) Identify the major CT imaging features of the idiopathic intersititial pneumonias based on the revised ATS/ERS diagnostic criteria for IPF. 3) Differentiate idiopathic pulmonary fibrosis from nonspecific interstitial pneumonia and chronic hypersensitivity pneumonitis. 4) Identify important complications of IPF. 5) Understand evolving role of quantitative CT in assessment of lung fibrosis.

ABSTRACT

Recent clinical trials in idiopathic pulmonary fibrosis (IPF) have resulted in approval of two new treatments for this condition. Given the central role of the radiologist in making the CT diagnosis of IPF, it is critical to understand the diagnostic criteria for this condition as recently revised by the ATS/ERS, and to distinguish it from other fibrosing interstitial pneumonias including nonspecific interstitial pneumonia (NSIP), connective tissue disease related lung fibrosis (CVD-ILD), and chronic hypersensitivity pneumonitis (HP). The radiologist also has an important role in identifying complications of lung fibrosis including acute exacerbations and lung cancer. Substantial advances have been made in developing CT techniques for quantification of lung fibrosis, which correlate with clinical severity and with mortality.

Sub-Events

RC101A Advances in Management of Pulmonary Fibrosis

Participants
Imre Noth, MD, Chicago, IL (*Presenter*) Speakers Bureau, Sumitomo Dainippon Pharma Co, Ltd; Speakers Bureau, F. Hoffmann-La Roche Ltd ; Speakers Bureau, Boehringer Ingelheim GmbH; Consultant, ImmuneWorks, Inc; Consultant, Gilead Sciences, Inc; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Boehringer Ingelheim GmbH

LEARNING OBJECTIVES

View learning objectives under main course title.

RC101B Fibrosing Interstitial Pneumonia: How to Sort Out the IP´s

Participants
Justus E. Roos, MD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC101C Critical Issues in Imaging of Idiopathic Pulmonary Fibrosis

Participants
David A. Lynch, MBBCh, Denver, CO (*Presenter*) Research support, Siemens AG; Scientific Advisor, PAREXEL International Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Gilead Sciences, Inc; Consultant, F. Hoffmann-La Roche Ltd; Consultant, Veracyte, Inc;

LEARNING OBJECTIVES

View learning objectives under main course title.

RC101D Quantification of Pulmonary Fibrosis

Participants
Brian J. Bartholmai, MD, Rochester, MN (*Presenter*) License agreement, ImBio, LLC; Scientific Advisor, ImBio, LLC; Scientific Advisor, Bristol-Myers Squibb Company

LEARNING OBJECTIVES

View learning objectives under main course title.

RC102

What´s New from the Radiology Residency Review Committee

Sunday, Nov. 29 2:00PM - 3:30PM Location: S403B

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
James C. Anderson, MD, Portland, OR (*Presenter*) Nothing to Disclose
Felicia Davis, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To provide updates from the Review Committee for Diagnostic Radiology. 2) To provide updates from ACGME. 3) To provide updates on ACGME's Next Accreditation System.

RC103

Read with the Experts (Cardiac Radiology) (An Interactive Session)

Sunday, Nov. 29 2:00PM - 3:30PM Location: N226

CA

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Moderator*) Research Grant, Toshiba Corporation;
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Research Grant, Toshiba Corporation;
Satinder P. Singh, MD, Birmingham, AL, (ssingh@uabmc.edu) (*Presenter*) Nothing to Disclose
Sanjeev Bhalla, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Jacobo Kirsch, MD, Weston, FL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To illustrate common cardiac pathologies encountered in noninvasive imaging. 2) To review imaging protocols designed to best depict cardiac pathology. 3) To review image post-processing tools to render cardiac imaging findings for interpretation and communication with referring clinicians. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

ABSTRACT

This session will include live reads with experts in cardiac radiology to meet the learning objectives. Specific cases and clinical scenatios will be presented to best demonstrate the pathology and the strategies for imaging and image interpretation.

URL

Honored Educators

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Sanjeev Bhalla, MD - 2014 Honored Educator
Jacobo Kirsch, MD - 2013 Honored Educator

RC104

Contemporary Problems in Arthritis Evaluation (An Interactive Session)

Sunday, Nov. 29 2:00PM - 3:30PM Location: E450B

MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Donald J. Flemming, MD, Hershey, PA (*Director*) Royalties, Reed Elsevier

LEARNING OBJECTIVES

1) Describe the multimodality imaging feattures of common arthropathies. 2) Describe key imaging features that help distinguish one arthritis from another commonly confused entity. 3) Describe important clinical features that help establish the correct diagnosis of an arthropathy. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

ABSTRACT

The purpose of this presentation is to discuss how to differentiate commonly confused athropathies using a case based interactive format. The utility of multiple modalities and incorporation of clinical data in establishing a correct diagnosis will be reviewed.

Sub-Events

RC104A Differentiating Rheumatoid Arthritis from Crystal Deposition Diseases

Participants
Donald J. Flemming, MD, Hershey, PA (*Presenter*) Royalties, Reed Elsevier

LEARNING OBJECTIVES

1) Describe the imaging features that differentiate rheumatoid arthritis and gout. 2) Describe the imaging features that differentiate rheumatoid arthritis and calcium pyrophosphate deposition disease.

ABSTRACT

Radiologists can have a tremendous impact on care of a patient suffering from an arthritis by confirming or establishing the correct diagnosis. Prevention of joint damage hinged on the correct diagnosis and therapeutic regimen. The purpose of this presentation is to review the imaging features that assist in differentiating rheumatoid from crystal deposition disease (gout and calcium pyrophosphate and hydroxyapatite deposition disease). A case based format will be used to demonstrate the critical radiographic, MRI, CT and ultrasound features that help establish the correct diagnosis.

RC104B Differentiating Appendicular Inflammatory from Degenerative Arthritis

Participants
Thomas M. Link, MD, PhD, San Francisco, CA, (thomas.link@ucsf.edu) (*Presenter*) Research funded, General Electric Company; Research funded, InSightec Ltd; Royalties, Springer Science+Business Media Deutschland GmbH; Research Consultant, Pfizer Inc;

LEARNING OBJECTIVES

1) To classify imaging studies of patients with arthropathies as inflammatory or degenerative. 2) To differentiate specific radiographic criteria of inflammatory arthropathies from those of degenerative osteoarthritis of the appendicular skeleton. 3) To identify findings that are found in both inflammatory and degenerative arthropathies, in particular in erosive osteoarthritis.

ABSTRACT

In general appendicular inflammatory arthropathies are characterized by loss of bone with juxta-articular osteopenia and erosive changes while degenerative arthritis shows increased bone formation with subchondral sclerosis and osteophytes. However, there is overlap as inflammatory arthropathies will eventually develop secondary degenerative changes and there is an erosive form of osteoarthritis (OA), which is typically found in older women. There are a number of criteria to differentiate OA and inflammatory arthropathies. These include location of abnormalities in the appendicular skeleton, which greatly helps to differentiate rheumatoid arthritis from OA (metacarpo-phalangeal/metatarsophalangeal joints in rheumatoid arthritis versus distal and proximal interphalangeal joints in OA) but not psoriatic arthritis and OA (distal and proximal interphalangeal joints in OA). Also inflammatory arthropathies and OA are both found at the radiocarpal, intercarpal and carpo-metacarpal joint 1. Differentiating erosive OA and psoriatic arthritis is a particular challenge as they both are erosive and may be found in the same locations. This lecture will present typical and more problematic cases of inflammatory and degenerative arthropathies, identify typical and overlapping findings and provide the attendees with a diagnostic approach to these entities.

RC104C Differentiating Sacroillitis from Its Mimickers

Participants
David C. Salonen, MD, Toronto, ON (*Presenter*) Consultant, AbbVie Inc; Consultant, Johnson & Johnson;

LEARNING OBJECTIVES

1) Discuss radiographic and MR criteria 'necessary' for the diagnosis of sarcoiliitis. 2) Describe the imaging features that differentiate inflammatory sarcoiliitis from its mimickers.

ABSTRACT

RC104D Differentiating Ankylosing Spondylitis from Spinal Degenerative Disease

Participants
Robert G. Lambert, MBBCh, Edmonton, AB (*Presenter*) Research Consultant, Abbott Laboratories

LEARNING OBJECTIVES

1) Differentiate specific patterns of bone marrow abnormality on spine MRI from non-specific changes. 2) Describe the patterns of bone formation on spine radiography in middle-aged patients that distinguish between degenerative causes and spondyloarthritis. 3) Recommend which patients with spinal ossification need further imaging to distinguish between spondyloarthritis and DISH.

ABSTRACT

Diffuse idiopathic skeletal hyperostosis (DISH) is a degenerative disorder characterized by flowing ossification in the spine occurring primarily in the anterior longitudinal ligament, and to a lesser extent, in paravertebral tissues and the peripheral part of the annulus fibrosus. The ossification is usually most prominent along the anterior and right anterolateral aspects of thoracic vertebral bodies and, on lateral x-ray, radiolucency may be noted between new bone and the vertebral body. Current classification criteria for DISH require spinal ankylosis across 3 consecutive intervertebral discs and less extensive ankylosis may present a diagnostic challenge when criteria are not met. Concomitant disc degeneration is frequent but is less prevalent at fused levels. DISH may involve the sacroiliac (SI) joints but with relative preservation of articular cartilage.Spondyloarthritis (SpA) is a group of inflammatory disorders that involve the joints and entheses of the axial and peripheral skeleton and is typified by ankylosing spondylitis (AS). Spinal involvement is characterized by inflammation at the attachment of the annulus fibrosus. Osteitis may be seen in the form of erosion and/or sclerosis of the vertebral corner and "squaring" of the vertebral bodies on lateral views of the spine is caused by adjacent periosteal reaction. In the periphery of the annulus fibrosus, formation of syndesmophytes are seen as vertical bony spurring that may extend to bridge the disc causing ankylosis. The inflammatory process may result in ankylosis of the costotransverse, costovertebral, and facet joints and interspinous ligaments.These two conditions are easily distinguished when seen in their common presentation. However, patients with an older than usual onset of SpA over the age of 40 may be hard to distinguish from early DISH and disc degeneration is common at all ages regardless of both DISH and SpA. In many cases when the diagnosis is uncertain, further imaging, especially with MRI, may be useful to distinguish between these two entities. However while some patterns of MRI involvement are highly specific for one condition or another, often bone marrow abnormalities in the spine are non-specific and being able to distinguish between these patterns is of considerable diagnostic importance.

RC104E Monitoring Response to Disease Modifying Therapy

Participants
Eric Y. Chang, MD, San Diego, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the role of the radiologist in the management of arthropathies. 2) Compare the ability of different imaging modalities to detect inflammation and structural alteration. 3) Assess the response after disease modifying therapy according to established criteria.

ABSTRACT

RC105

Difficult Diagnoses in Neuroradiology

Sunday, Nov. 29 2:00PM - 3:30PM Location: S406B

NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Christopher P. Hess, MD, PhD, Mill Valley, CA, (christopher.hess@ucsf.edu) (*Moderator*) Research Grant, General Electric Company; Research Grant, Quest Diagnostics Incorporated; Research Grant, Cerebrotech Medical Systems, Inc;
Vincent P. Mathews, MD, Milwaukee, WI (*Moderator*) Nothing to Disclose

Sub-Events

RC105A Pituitary Lesions: Not as Easy as They Seem

Participants
Michael N. Brant-Zawadzki, MD, Newport Beach, CA, (mbrant@hoag.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Appreciate the prevalence of "incidental" lesions within the pituitary gland, and their origin. 2) Differentiate intrinsic pituitary gland lesions from non-pituitary lesions simulating intrinsic disease. 3) Utilize common MRI parameter choices to help specify pathology in the pituitary region.

ABSTRACT

The pituitary gland's size, important function, and detailed surrounding anatomy of disparate structures makes it an "acid test" for the accuracy and specificity of any imaging modality. The multiplicity of intrinsic lesions, as well as the plethora of surrounding structural histology produces a wide bandwidth of abnormalities in the pituitary fossa and its environs. A systematic approach to analyzing lesions of the pituitary region will be presented, common pitfalls explored, and atypical examples utilized to review the approach to a targeted differential diagnosis for lesions of this region.

RC105B Is it Vasculitis?

Participants
Daniel M. Mandell, MD, Toronto, ON, (danny.mandell@uhn.ca) (*Presenter*) Research funded, General Electric Company;

LEARNING OBJECTIVES

1) Appreciate the spectrum of imaging findings in CNS vasculitis. 2) Appreciate findings that help differentiate among related conditions. 3) Understand the role of imaging relative to other tests (CSF sampling, biopsy etc…).

ABSTRACT

Abstract:Central nervous system (CNS) vasculitis is relatively uncommon. However, multifocal abnormalities on CT/MRI and/or intracranial arterial narrowing on CTA/MRA often leads to consideration of this diagnosis. I will discuss the spectrum of imaging findings in CNS vasculitis, including brain parenchymal and meningeal findings, angiographic findings, and the emerging role of vessel wall MRI. I will then focus on the differential diagnosis, and findings that can help differentiate among conditions that mimic vasculitis. Finally, we will consider how imaging fits into the broader clinical work-up which may include cerebrospinal fluid sampling and biopsy.

RC105C Spontaneous Intracranial Hypotension

Participants
William P. Dillon, MD, San Francisco, CA, (william.dillon@ucsf.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the clinical presentation, variations thereof, and MR and CT featurs of SIH. 2) Understand the approach to treatment of SIH with autologous blood patch. 3) Understand the potential complications of SIH, and blood patch.

ABSTRACT

Spontaneous intracranial hypotension (SIH) is a syndrome of low cerebrospinal fluid volume and or pressure that typically results from either a spinal dural defect at a perineural cyst or from an osteophyte/ disc penetrating through the ventral dura. Postural headache is the most common symptom. Other reported symptoms include nausea, vertigo, cranial nerve palsies, visual impairment, quadriplegia, and coma. Because of the nonspecific nature of symptoms, the diagnosis may be missed or mistaken for other disease entities. These patients may be surgically treated for subdural fluid collections or 'Chiari 1 malformations' instead of the underlying spinal cause of intracranial hypotension. Patients with connective tissue disorders - such as Marfan syndrome, Ehlers-Danlos syndrome, and autosomal dominant polycystic kidney disease - are at increased risk of SIH. The most appropriate therapy for SIH is an epidural blood patch, which ideally should be directed to the location of the leak, if it is known. If the location of the leak is unknown, then the epidural blood patch can be placed in a nonselective fashion. Described imaging findings of SIH include diffuse pachymeningeal enhancement, subdural fluid collections, cerebellar tonsillar herniation, distention of the dural venous sinuses, enlargement of the pituitary gland and downsloping of the floor of the third ventricle. Ct guided epidural blood patch following detection of the CSF fistula is the most efficient and appropriate first line of therapy. The diagnostic findings, complications of

untreated SIH, and the approach to the patient with suspected CSF fistula of the spine will be discussed.

RC106

Anatomy and Pathology of the Pharynx and Larynx

Sunday, Nov. 29 2:00PM - 3:30PM Location: E450A

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC106A Imaging the Nasopharynx

Participants
Nancy J. Fischbein, MD, Stanford, CA, (fischbein@stanford.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the normal anatomy of the nasopharynx. 2) Illustrate the appearance and patterns of spread of nasopharyngeal carcinoma. 3) Describe additional pathologies of the nasopharynx, along with imaging pearls and pitfalls.

ABSTRACT

The nasopharynx is the uppermost portion of the upper aerodigestive tract, and it is located posterior to the nasal cavity, inferior to the sphenoid sinus, and anterior to the clivus and craniovertebral junction, above the level of the soft palate. Given its intimate relationship with the central skull base, detailed knowledge of the anatomy of the central skull base, including its canals and foramina, is critical to understanding the spread of disease in this region. Though CT is helpul in imaging diseases of this region, a good knowledge of MR anatomy, and an understanding of optimal MR imaging protocols, is essential to proper imaging and imaging interpretation of diseases of the nasopharynx. We will spend some of our time discussing nasopharyngeal carcinoma, including its demographics, staging, and imaging appearance, but we will also review benign pathologies of the nasopharynx, and other malignant entities. We will also review some imaging pearls for each entity, and also imaging pitfalls, as there are many ways in which the unwary radiologist can overlook or misinterpret significant pathology in the nasopharynx.

RC106B Imaging the Oropharynx

Participants
Suresh K. Mukherji, MD, Northville, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the normal anatomy of the oropharynx. 2) Illustrate the normal spread patterns of tumors involving various subsites of the oropharynx. 3) Describe the appearance of various infectious and inflammatory processes involving the oropharynx.

ABSTRACT

Imaging plays a crucial role in evaluating the evaluating the oropharynx. This talk will review the normal anatomy and malignancies involving the oropharynx. The presentation will also review various inflammatory and infectious processes that involve different parts of the oropharynx.

RC106C Imaging the Larynx and Hypopharynx

Participants
Peter M. Som, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The registrants will learn the intimate relationship between the larynx and hypophartnx. 2) The antomy of the larynx and hypopharynx will be reviewed. 3) The major pathology of these structures will be reviewed.

ABSTRACT

The larynx is situated wiithin the hypopharynx and thus their intimate relationship. The anatomy of the larynx and the hypopharynx will be reviewed, especially as it pertains to neoplasms. The scope of inflammatory and neoplastic diseases that affect these structures will be reviewed with particular attention to what should be included in the radiologist's report to create a pertainent and meaning report.

RC107

Renal Cell Carcinoma: How Imaging Can Be Used to Select among Treatment Options and Monitor Response

Sunday, Nov. 29 2:00PM - 3:30PM Location: N227

GU

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Erick M. Remer, MD, Cleveland, OH, (remere1@ccf.org) (*Coordinator*) Nothing to Disclose
Steven S. Raman, MD, Santa Monica, CA (*Presenter*) Nothing to Disclose
Raghunandan Vikram, MBBS, FRCR, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The attendee will learn how imaging can be used to predict renal tumor subtype and grade. 2) Imaging findings that guide renal tumor management toward percutaneous tumor ablation, partial, and radical nephrectomy will be described. 3) The use of imaging to evaluate patients after tumor ablation and nephrectomy will be reviewed. Assessment methods will be compared and complications will be illustrated. 4) Methods for assessing tumor response after chemotherapy such as RECIST, WHO, Choi / Modified Choi, SACT, and MASS criteria will be discussed with illustrative examples. Imaging appearances of post therapy complications will be reviewed.

ABSTRACT

Honored Educators

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Raghunandan Vikram, MBBS, FRCR - 2012 Honored Educator

RC108

Combat and Forensic Radiology

Sunday, Nov. 29 2:00PM - 3:30PM Location: N230

ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC108A Imaging of Drug Smuggling

Participants
Ferco H. Berger, MD, Amsterdam, Netherlands, (f.berger@vumc.nl) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Comprehend the socio-economic background of drugs and the different ways of intra-corporeal transportation and packing materials used. 2) Analyze the different imaging techniques for detection of illicit drugs trafficking, detect the findings and know the potential lack thereof. 3) Comprehend with the complications that can occur and the imaging findings thereof.

ABSTRACT

The drugs industry is reported to make up to almost 1% of global GDP and 1/3 of the population has tried illicit drugs in their life. Overdosing causes a staggering estimated 1 death per hour in Europe alone. Trafficking of drugs occurs by ingestion (body packers) or vaginal/rectal insertion (body pushers). As can be imagined, ingestion / insertion of packets of drugs can cause different kinds of clinical problems, depending on packaging material and type of drug. Detection of packets by screening methods as well as acute and subacute clinical conditions and the depiction thereof by different imaging modalities will be discussed. The participants of this RC will get to know the current developments in both the packets as well as the imaging of their features and complications.

RC108B The Virtual Autopsy-Bridging Radiology and Forensics

Participants
Michael J. Thali, MD, Zurich, Switzerland, (thali@irm.uzh.ch) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To Improve basic knowledge and skills of forensic imaging for radiologists. 2) To give an update of the historical and current development and techniques in forensic imaging in the world. 3) To present the newest research areas in forensic imaging and radiology. 4) To discuss workflow and present possibilities and options. 5) To show how to get involved in forensic imaging / radiology.

ABSTRACT

The modern virtual autopsy approach (called Virtopsy) began at the turn of the millennium as multi-disciplinary applied research project to implement imaging modalities from diagnostic radiology and surveying technology in forensic sciences. Since then, the Virtopsy approach has become a standard procedure in forensic investigations. Today, computed tomography, magnetic resonance imaging, optical 3D surface scanning, and 3D photogrammetry are routinely used to detect and document forensic evidence in a minimally-invasive and observer-independent manner in both the living and the deceased.Virtopsy can enhance traditional autopsy or even replace it in selected cases. One of the main benefits of imaging lies in the observer-independent documentation of forensically relevant findings. In addition, digital imaging data can be stored permanently and may be re-examined at any time if a second opinion is required.In living patients, Virtopsy permits the documentation of patterned injuries such as bite marks, bruises, lacerations, and abrasions. Documentation is made in three dimensions, true to scale, and enables comparison of injuries to potential injury causing instruments.Virtopsy provides in the court excellent tools for crime and accident reconstruction, including 3D depictions of internal injuries, 3D true color representations of surface injuries and even 3D scaled models of entire crime scenes and events. The Virtopsy approach reproduces critical forensic evidence in an unbiased and comprehensible fashion, suitable for presentation as evidence to laypersons and legal professionals.

RC108C Medical Effects of Nuclear Weapons

Participants
Bruce R. Javors, MD, New York, NY, (bjxraydoc@gmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Compare conventional and nuclear weapons and explain their fundamental differences. 2)Comprehend the various short term effects including thermal, blast and radiation injuries. 3) Identify and understand the long term consequences of nuclear blasts especially those from radiation exposure. 4) Understand the societal disruption that may follow the use of nuclear weapons.

ABSTRACT

Since 1945 society has been faced with both the possible and real aftermaths of nuclear weapons and their use.Nuclear weapons are both quantitatively and qualitatively different from chemical explosives. Those differences will be briefly presented.Immediately after detonation, most of the energy released by a weapon is in the form of blast and heat with only a small amount of radiation produced. The formers' effects on most organ systems will be reviewed along with acute radiation sickness and the resultant difficulties of shielding oneself from those effects.The delayed results of radiation exposure will also be discussed. Included are carcinogenesis and mutagenesis. Possible ecologic and social disruption will be presented. Focus will also be placed on infectious

diseases especially in light of both the diminished host and organized medical responsiveness.The myths and realities of terrorist devices, so-called suitcase bombs, will be reviewed.Appropriate video and still photographs will accompany many of the above items.

RC109

MR Techniques in GI Cancers

Sunday, Nov. 29 2:00PM - 3:30PM Location: E352

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

Sub-Events

RC109A Liver Specific Contrast Agents

Participants
Giuseppe Brancatelli, MD, Palermo, Italy, (gbranca@yahoo.com) (*Presenter*) Speaker, Bayer AG

LEARNING OBJECTIVES

1) Describe the mechanism of action of liver specific contrast agents. 2) Understand the added value of liver-specific contrast agents in the characterization of focal liver lesions. 3) Identify the most common pitfalls and limitations of liver specific contrast agents.

ABSTRACT

RC109B Diffusion-weighted Imaging

Participants
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the basic concepts for DWI in body applications. 2) Describe the emerging role of DWI in assessing response in cancer. 3) Discuss the application of DWI in whole body imaging.

Honored Educators

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Ihab R. Kamel, MD, PhD - 2015 Honored Educator

RC109C MR Perfusion

Participants
Hersh Chandarana, MD, New York, NY (*Presenter*) Equipment support, Siemens AG; Software support, Siemens AG; Consultant, Bayer, AG;

LEARNING OBJECTIVES

1) Understand basic principles of Perfusion Weighted Imaging (PWI) 2) Understand steps involved in performing PWI 3) Clinical applications and limitations will be highlighted.

ABSTRACT

ABSTRACT:DCE-MRI refers to the high temporal resolution imaging performed before and after administration of gadolinium contrast. This dynamic contrast-enhanced (DCE)-MRI can be used to assess organ and/or tumor perfusion (PWI). PWI can provide insight into tumor vascularity and possibly early treatment response to antiangiogenic therapies. Basic concept of perfusion weighted imaging as well as acquisition and image analysis schemes will be briefly discussed. Potential clinical applications and challenges to clinical implementation will be highlighted.

RC109D PET MR

Participants
Alexander R. Guimaraes, MD, PhD, Portland, OR (*Presenter*) Speakers Bureau, Siemens AG; Expert Witness, Rice, Dolan, Kershaw

LEARNING OBJECTIVES

1) Understand the unique challenges in the physics underlying PET/MRI. 2) Understand the unique role of PET/MRI in diagnosing and staging GI Malignancies. 3) Understand the potential future role of PET/MRI in both diagnosing GI malignancies and in assessing novel therapeutic response.

ABSTRACT

RC110

Gynecologic Ultrasound (An Interactive Session)

Sunday, Nov. 29 2:00PM - 3:30PM Location: E353B

GU OB US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC110A Uterus and Endometrium

Participants
Ruth B. Goldstein, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be able to state the acceptable standards for endometrial assessment in women with abnormal vaginal bleeding. 2) Be able to recognize a uterine abnormality in a postmenopausal woman that warrants further evaluation including tissue sampling or MRI. 3) Be able to recognize and diagnose adenomyosis.

Active Handout:Ruth Beth Goldstein

http://abstract.rsna.org/uploads/2015/15001988/RC110A.pdf

RC110B Ovarian Masses

Participants
Phyllis Glanc, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Evaluate critical ultrasound features of adnexal masses that permit stratification into benign, indeterminate or suspicious for malignancy. 2) Incorporate the role of guidelines, consensus statements, risk prediction algorithms and serum biomarkers. 3) Consider the role of alternate imaging modalities such as MRI, CT, PET-CT. 4) Utilize appropriate management strategies.

ABSTRACT

There remains a gap between the state of the knowledge and translation into practice for the diagnosis and management of adnexal masses. Pelvic ultrasound remains the primary imaging modality in the greater majority of cases. Most ovarian masses can be correctly classified on the basis of their ultrasound characteristics, nonetheless many masses that are 'almost certainly benign' or even 'indeterminate' come to prompt surgical exploration, which is not always apprpriate or without its potential risks.. This session will explore further these characteristic findings but also will evaluate the role of serial ultrasound, additional modalities such as MR or CT, serum biomarkers, strategies such as IOTA simple rules and optimization of referral patterns.

Active Handout:Phyllis Glanc

http://abstract.rsna.org/uploads/2015/15001989/RC110B.pdf

RC110C Endometriosis

Participants
Luciana P. Chamie, MD, PhD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define clinical and epidemiological aspects of endometriosis. 2) Define the importance of imaging mapping for endometriosis before clinical counseling. 3) Apply the most appropriate technique to investigate endometriosis. 4) Define the bowel preparation required for the transvaginal ultrasound to investigate endometriosis. 5) Apply the imaging algorithm to map deeply infiltrative endometriosis. 6) Assess the ultrasonographic findings of deeply infiltrative endometriosis in the most common sites such as bladder, vesicouterine pouch, retrocervical space, vagina, ureters, appendix and rectosigmoid colon. 7) Assess the ultrasonographic findings of ovarian endometriomas and differentiate them from functional cysts.

ABSTRACT

Endometriosis is a very common gynecological disease affecting millions of women in their reproductive life, often causing pelvic pain and infertility. Clinical history and physical examination may suggest endometriosis, but imaging mapping is necessary to identify the disease and mandatory for clinical couseling and surgical planning. Transvaginal ultrasound after bowel preparation is the best imaging modality as the first-line technique to evaluate patients suspected of endometriosis. The bowel preparation is relatively simple and include the day before and the day of the examination. This method is highly accurate to identify intestinal endometriosis and to determine which layers of the bowel wall are affected. In addition, it provides better assessment of small peritoneal lesions of the retrocervical space, vagina and bladder. Pelvic adhesions can also be evaluated during the exam.

URL

http://chamie.com.br/download

Active Handout:Luciana Pardini Chamie

http://abstract.rsna.org/uploads/2015/15001990/Active RC110C.pdf

RC111

Head and Neck Cancer PET Interpretation with Case Examples (An Interactive Session)

Sunday, Nov. 29 2:00PM - 3:30PM Location: S505AB

HN NR CT NM OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC111A Practical Approach for Interpreting Head and Neck PET/CT

Participants
Rathan M. Subramaniam, MD, PhD, Baltimore, MD, (rsubram4@jhmi.edu) (*Presenter*) Travel support, Koninklijke Philips NV

LEARNING OBJECTIVES

1) To understand the value of PET/CT in the care process of managing head and neck cancer. 2) To learn common pathways of tumor spread in head and neck. 3) To review illustrative cases and pitfalls of interpretation.

ABSTRACT

RC111B PET/CT for Head and Neck Cancer: Clinical Applications and Case Studies

Participants
Eric M. Rohren, MD, PhD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review head and neck anatomy and physiologic sites of FDG uptake. 2) Review the impact of FDG-PET/CT on the management of patients with head and neck malignancies.

ABSTRACT

FDG-PET/CT provides valuable information in the assessment of the patient with cancers of the head and neck. The metabolic information determined by FDG is complimentary and additive to the anatomic information from CT, and can be used to direct surgery, plan radiation therapy, and evaluate response to systemic or localized treatment. In this presentation, the role of FDG-PET/CT in the management of head and neck cancer will be presented, using case examples to illustrate the utility of PET as well as common pitfalls.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Eric M. Rohren, MD, PhD - 2015 Honored Educator

RC111C The Head and Neck Surgeon's Perspective: What I Need to Know

Participants
Nishant Agrawal, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the indications of PET/CT in head and neck cancer. 2) Review the impact of PET/CT on staging in head and neck cancer. 3) Review the role of PET/CT in the evaluation of the unknown primary. 4) Review the role of post-treatment PET/CT.

RC112

Imaging and Endografts (An Interactive Session)

Sunday, Nov. 29 2:00PM - 3:30PM Location: S103AB

VA IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC112A TEVAR Indications and Outcomes

Participants
Michael D. Dake, MD, Stanford, CA (*Presenter*) Scientific Advisory Board, W. L. Gore & Associates; Scientific Advisory Board, Abbott Laboratories; Research Consultant, Cook Group Incorporated; Research Consultant, TriVascular, Inc; Research Consultant, Medtronic, Inc; Research Consultant, Intact Vascular, Inc; Research Consultant, Novate Medical ; Research support, Cook Group Incorporated; Research support, Medtronic,Inc; Research support, W. L. Gore & Associates, Inc; ;

LEARNING OBJECTIVES

1) Understand the current applications of thoracic endografts for management of thoracic aortic pathologies. 2) Recognize the benefits and existing limitations of current endograft technologies for treatment of different aortic lesions. 3) Identify the complications and failure modes of TEVAR. 4) Know the current outcome metrics typically evaluated after TEVAR treatment of thoracic aneurysms and aortic dissections. 5) List the important imaging findings and criteria currently used to assess the suitability of aortic anatomy for TEVAR.

RC112B New Endografts for Complex AAA

Participants
Constantino S. Pena, MD, Miami, FL (*Presenter*) Speakers Bureau, Cook Group Incorporated; Advisory Board, C. R. Bard, Inc; Advisory Board, Boston Scientific Corporation; Advisory Board, General Electric Company;

LEARNING OBJECTIVES

1) Discuss the status of established AAA endografts. 2) Discuss new endografts for the treatment of AAA. Particularly discuss areas of improvement over established endografts. 3) Present data on novel endografts being developed.

RC112C Old Endografts with New Complications

Participants
Elliot K. Fishman, MD, Owings Mills, MD (*Presenter*) Research support, Siemens AG Advisory Board, Siemens AG Research support, General Electric Company Advisory Board, General Electric Company Co-founder, HipGraphics, Inc

LEARNING OBJECTIVES

1) Understand the spectrum of complications which may be seen in patients with endografts that have been in place for several years and the significance of these complications. 2) Develop a strategy for the evaluation of endovascular stents with specific scanning protocols and the role of post processing of the data into 3D. 3) understand the complexities of complications including involvement of bowel and adjacent organs and the CT findings that can suggest these complications.

ABSTRACT

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Elliot K. Fishman, MD - 2012 Honored Educator
Elliot K. Fishman, MD - 2014 Honored Educator

RC113

Pediatric Series: Fetal/Neonatal

Sunday, Nov. 29 2:00PM - 3:30PM Location: S102AB

GU OB MR PD

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

Participants
Daniela Prayer, MD, Vienna, Austria (*Moderator*) Nothing to Disclose
Amy R. Mehollin-Ray, MD, Houston, TX, (armeholl@texaschildrens.org) (*Moderator*) Nothing to Disclose

Sub-Events

RC113-01 Fetal MRI of Genitourinary Tract Abnormalities

Sunday, Nov. 29 2:00PM - 2:20PM Location: S102AB

Participants
Ann M. Johnson, MD, Philadelphia, PA, (johnsona@email.chop.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn basic fetal MRI techniques and relevent embryology. 2) Understand what fetal MRI can add in evaluation of genitourinary (GU) abnormalities. 3) Become familiar with patterns of fetal GU abnormalities with an emphasis on complex lesions affecting multiple organ systems, such as cloacal malformation spectrum and exstrophy. 4) The purpose of the course is to understand the potential role of fetal MRI in the evaluation of fetal genitourinary tract abnormalities. There will be an emphasis on complex lesions affecting multiple organ systems, such as cloacal malformation spectrum and exstrophy.

RC113-02 Novel Nanoparticle Gd Contrast Agent Does Not Penetrate the Placental Barrier

Sunday, Nov. 29 2:20PM - 2:30PM Location: S102AB

Participants
Anil N. Shetty, PhD, Houston, TX (*Presenter*) Nothing to Disclose
Ketan B. Ghaghada, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Robia Pautler, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Wesley Lee, MD, Houston, TX (*Abstract Co-Author*) Research support, General Electric Company Research support, Koninklijke Philips NV Research support, Siemens AG Research support, Samsung Electronics Co Ltd
Haijun Gao, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Chandra Yallampalli, DVM,PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
David Rendon, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ananth Annapragada, PhD, Houston, TX (*Abstract Co-Author*) Stockholder, Marval Pharma Ltd Stockholder, Alzeca Biosciences LLC Stockholder, Sensulin LLC Stockholder, Abbott Laboratories Stockholder, Johnson & Johnson

PURPOSE

Gd contrast agent usage in placental imaging is generally contraindicated, for concerns related to fetal contrast agent exposure. We therefore developed a A novel liposomal Gd nanoparticle contrast agent for T1-MRI, retaining the Gd on the maternal side, thus shielding the fetus from potential toxicities. In this study, we tested this agent in placental imaging in a mouse model, and measured its transplacental permeability.

METHOD AND MATERIALS

Female C57BL/6 mice, pregnant at gestational age E16.5±1 days, were imaged by T1-MRI on a 9.4T small animal MRI (Bruker Instruments) using a conventional contrast agent (Multihance, a meglumine salt of Gd-BOPTA chelate) (13 mice) and using the novel nanoparticle Gd agent (9 mice). DCE-MRI was conducted using consecutive 3D-SPGRE sequences at a constant flip angle of 16°, TE/TR=1.93ms/6ms, FOV = 3x3x2.5cm, matrix = 128x128x16. Each image was converted to a T1 map, and the contrast agent concentration on a pixel-by-pixel basis, estimated from the known relaxivity. After imaging, the mice were sacrificed and the Gd content of the placenta and fetus measured using ICP-AES.

RESULTS

Image and data shown below are representative of each cohort. The placentae are rather small (2mmx3mm) but are still clearly defined, and obviously not invasive into the uterine wall. Signal intensities in the placental and fetal ROI's, indicative of Gd concentration in each compartment, clearly show that the conventional Gd chelate agent penetrates the placental barrier and enters the fetus. The nanoparticle agent however, does not do so, indicated by zero signal in the fetal compartment throughout the duration of this experiment. The ICP-AES study confirmed the imaging study results, with no detectable Gd in the fetal compartment. A separate study in human placentae using an ex vivo perfused placenta preparation, also confirmed these results.

CONCLUSION

The nanoparticle contrast agent does not penetrate the placental barrier in a mouse model. The data are consistent with separate tests on a perfused human placenta model.

CLINICAL RELEVANCE/APPLICATION

The incidence of placenta accreta has increased 8-fold in the last 30 years, and improved methods for placental imaging are sorely needed. Nanoparticle Gd contrast agents described in this work could be useful for placental imaging, while maintaining fetal safety.

RC113-03 Normal and Abnormal Development of the Cerebellar Vermis - A Quantitative Fetal MRI Study

Sunday, Nov. 29 2:30PM - 2:40PM Location: S102AB

Participants
Gregor Kasprian, MD, Vienna, Austria (*Presenter*) Nothing to Disclose
Gregor Dovjak, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Peter C. Brugger, MD, PhD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Gerlinde Gruber, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Georg Langs, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Michael Weber, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Ernst Schwartz, MSc, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Dieter Bettelheim, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Daniela Prayer, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Postnatal neurodevelopmental outcome of fetuses with hindbrain malformations is dependent on normal growth and development of the cerebellar vermis. This comparative in vivo and post mortem fetal MRI study aims to quantitatively assess the relative dimensions of respective vermian lobules between 18 to 32 gestational weeks (GW) in normal and pathological conditions.

METHOD AND MATERIALS

75 fetuses (18-32 GW, mean 25.7GW) with normal brain development and 20 fetuses with different types of hindbrain malformations were scanned prenatally (1.5T, T2-TSE, voxel size 0.72/0.72/4.4mm - 1.0/1.0/4.4mm) and seven fetuses (16-30GW, mean 21.9GW, 3T, CISS sequence, resolution: 0.33/0.33/0.33mm) scanned within 24 hours postmortem were selected for postprocessing. A T2-weighted midline sagittal slice was identified and 2D vermian segmentation was performed using ITK snap (Figure).

RESULTS

The mean proportional size of 7/9 discriminable vermian lobules did not differ between in vivo and post mortem measurements. The relative size of the following lobules increased during gestation (Pearson, $p<0.05$): Culmen ($r^2=.460$) and Declive/Folium/Tuber ($r^2=.453$). The proportions of Lingula ($r^2=-.439$), Centrum ($r^2=-.554$), Pyramis ($r^2=-.303$) and Nodulus ($r^2=-.491$) decreased with gestational age. The relative size of the Uvula did not show age specific changes ($p=.201$). Certain types of hindbrain malformations showed common patterns of cerebellar lobular hypoplasia.

CONCLUSION

Fetal vermian lobulation can be accurately assessed by MRI between 18 and 32GW in normal and pathological conditions in vivo . Growth of specific vermian lobules is nonuniform during the second and third trimester. Distinct patterns of vermian lobular hypoplasia can be described antenatally.

CLINICAL RELEVANCE/APPLICATION

Knowledge about the distinct growth patterns of specific vermian lobules is helpful in the prognostic classification of fetal hindbrain malformations.

RC113-04 MRI-US Fusion Imaging in Real-Time Virtual Sonography for the Evaluation of Fetal Anomalies: Preliminary Stud

Sunday, Nov. 29 2:40PM - 2:50PM Location: S102AB

Participants
Silvia Bernardo, MD, Rome, Italy (*Presenter*) Nothing to Disclose
Valeria Vinci, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Matteo Saldari, MD, PhD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Antonella Giancotti, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Carlo Catalano, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Lucia Manganaro, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Camilla Aliberti, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Magnetic resonance imaging (MRI) and ultrasound (US) scanning complement each other in the screening and diagnosis of fetal anomalies. Real-time virtual sonography (RVS) is a new technique that uses magnetic navigation and computer software for the synchronized display of real-time US and multiplanar reconstruction MRI images. The purpose of this study was to evaluate the feasibility and ability of RVS to assess the main pathologies in fetuses with suspected US anomalies.

METHOD AND MATERIALS

This study was conducted over a two-month period march-april 2015 in 30 patients referred for a morphological fetal US-based evaluation. Patients undergone Fetal MRI at 1.5 T for fetal anomalies were offered fusion imaging (Hitachi HI Vision Ascendus).The MRI image dataset acquired at the time of the examination was loaded into the fusion system and displayed together with the US image on the same monitor. Both sets of images were then manually synchronized and image were registered using multiple planes MR imaging.The ability of this combined image (RVS imaging) to assess the main anatomical sites and fetal anomalies was evaluated and compared with standard B-Mode US and MRI images previously acquired.

RESULTS

In all cases RVS was technically possible, with a 100% match between MR images and US images. Data registration, matching and fusion imaging were performed in less than 15-20 minutes. On a total of 30 fetuses, 20 were for the encephalic district and 10 for the body (8 thoraco- abdominal; 2 heart). In all cases RVS was technically possible, with a 100% match between MR images and US images. In 10 cases of body abnormalities, fusion imaging helped the diagnosis in 20%. In the 10/20 cases of encephalic pathology, fusion imaging improved the diagnosis; in the other 10 cases MRI was superior to US even using the RVS.

CONCLUSION

The present work is a preliminary study on the feasibility and practical use of a Fetal MRI-US real-time fusion imaging. Thanks to

informations from both US and MRI, fusion imaging allows better identification of the different fetal pathologies and could improve the performance of ultrasound examination.

CLINICAL RELEVANCE/APPLICATION

Fusion imaging is feasible for the assessment of fetal abnormalities. Because it combines information from both US and MRI techniques, fusion imaging allows better identification of the different fetal pathologies.

RC113-05 Predictive Value of the MRI-based Ratio of Fetal Lung Volume to Fetal Body Volume in Congenital Diaphragmatic Hernia in Comparison to the MR Fetal Lung Volume and the Sonographic Lung-to-Head Ratio

Sunday, Nov. 29 2:50PM - 3:00PM Location: S102AB

Participants
Claudia Hagelstein, MD, Mannheim, Germany (*Presenter*) Nothing to Disclose
Silke von Mittelstaedt, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Meike Weidner, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Christel Weiss, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Regine Schaffelder, MD, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Thomas Schaible, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Stefan O. Schoenberg, MD, PhD, Mannheim , Germany (*Abstract Co-Author*) Institutional research agreement, Siemens AG
Wolfgang Neff, MD, PhD, Alzey, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate prognostic accuracy of the MRI-based ratio of fetal lung volume to fetal body volume (MR-FLV/FBV) in fetuses with congenital diaphragmatic hernia (CDH) and to compare it to established prognostic parameters (the observed-to-expected MR fetal lung volume [o/e-MR-FLV] and the US-based observed-to-expected lung-to-head ratio [o/e-LHR]) with regard to survival, extracorporeal membrane oxygenation (ECMO) requirement and development of a chronic lung disease (CLD).

METHOD AND MATERIALS

Fetal MRI was performed in 132 patients with isolated CDH (mean gestational age 32.8±3.8 weeks) to measure FLV and FLV/FBV. Sonographic assessment of the LHR was performed within three days before or after fetal MRI. To obtain parameters that were independent from gestational age, the o/e-MR-FLV and the o/e-LHR were calculated based on normal controls, whereas calculation of the MR-FLV/FBV is independent from normal controls.

RESULTS

91% of the neonates survived, 37% needed ECMO therapy and 45% developed a CLD. All prenatal parameters revealed an excellent correlation with patients´ clinical outcome. MR-FLV/FBV, o/e-MR-FLV and o/e-LHR were significantly higher in survivors (p always <0.0001). Patients with ECMO requirement and patients with CLD showed a significantly lower MR-FLV/FBV, o/e-MR-FLV or o/e-LHR (p always <0.0001). Prognostic accuracy regarding survival was quite similar for the three parameters (AUC MR-FLV/FBV : 0.830, AUC o/e-MR-FLV : 0.868, AUC o/e-LHR : 0.845). Regarding ECMO requirement (AUC MR-FLV/FBV : 0.844, AUC o/e-MR-FLV : 0.843, AUC o/e-LHR : 0.736) and development of CLD (AUC MR-FLV/FBV : 0.778, AUC o/e-MR-FLV : 0.795, AUC o/e-LHR : 0.738) the MR-FLV/FBV and o/e-MR-FLV showed a slightly better prognostic accuracy compared to the o/e-LHR.

CONCLUSION

In CDH, assessment of pulmonary hypoplasia based on the MR-FLV/FBV, the o/e-MR-FLV or the o/e-LHR is quite similar in predicting survival. Regarding ECMO requirement and development of CLD, the o/e MR-FLV and the MR-FLV/FBV showed a slightly better prognostic accuracy compared to the US-based o/e-LHR. Compared to other prognostic parameters, MR-FLV/FBV has the advantage of being independent from the reference to a normal control group.

CLINICAL RELEVANCE/APPLICATION

In CDH, MRI-based MR-FLV/FBV and o/e-MR-FLV as well as US-based o/e-LHR are excellent and almost equivalent parameters to predict survival, ECMO-requirement and development of CLD.

RC113-06 Correlation between Fetal and Postmortem Magnetic Resonance Imaging and Conventional Autopsy in the Detection of Fetal Abnormalities

Sunday, Nov. 29 3:00PM - 3:10PM Location: S102AB

Participants
Matteo Saldari, MD, PhD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Silvia Bernardo, MD, Rome, Italy (*Presenter*) Nothing to Disclose
Carlo Catalano, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Valeria Vinci, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Lucia Manganaro, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare Fetal and postmortem MRI and conventional autoptic findings in cases of major pathological abnormalities.

METHOD AND MATERIALS

In this prospective study we enrolled 128 fetuses with identified US findings of severe fetal malformations, with local research ethics committee approval. Among these, we performed 94 whole body Fetal MRI on 94 fetuses using a 1.5 T MR scanner and of these, only 89 women undewent termination of pregnancy because of the fetal abnormalities. Of the 89 patients, 80 (90%) consented to postmortem MRI alone; 59 (66%) women consented to both postmortem MRI and conventional autopsy and formed our study group. Following delivery, fetuses were stored in refrigerated compartments prior to MR imaging and autopsy. Also for the post-mortem imaging evaluation we acquired whole body MR imaging using a 1.5 T MR scanner. MR images were reviewed by a team of two radiologists blinded to the autoptic data. Pathologists who performed conventional autopsy were blinded to the MR data; autoptic data were considered the gold standard.

RESULTS

Final autoptic diagnoses were: polycystic kidney disease (n=15), diaphragmatic hernia (n=10), lissencephaly (n=4), type-2 Arnold-Chiari malformation (n=6), Dandy-Walker syndrome (n=13), cloacal malformation (n=1), anencephaly (n=1), holoprosencephaly (n=4), rhombencephalosynapsis (n=2), Walker-Warburg syndrome (n=2), schizencephaly (n=1).MRI-autopsy provided additional information in 10/59 (17%) compared to fetal MRI.In 6 cases (10%) conventional autopsy provided superior diagnostic information compared to MRI-autopsy. On the other hand, in 7 cases (12%) the disruption of the anatomy during autoptic dissection of the fetal body couldn't allow a correct identification of the pathology.

CONCLUSION

MR autopsy is accepted by nearly all mothers while conventional autopsy is accepted by about two-thirds of mothers, it provides similar information compared to conventional autopsy in case of fetal malformations and it allows the evaluation of the pathology in case of tissue disruption during the autoptic evaluation.

CLINICAL RELEVANCE/APPLICATION

Fetal MRI can add significant additional information and may be use to guide conventional autopsy

RC113-07 Imaging of Ambiguous Genitalia

Sunday, Nov. 29 3:10PM - 3:30PM Location: S102AB

Participants
Jeanne S. Chow, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The purpose of this course is to understand the important role of the radiologists in infants with ambiguous genitalia. Imaging techniques as well as important imaging findings will be detailed.

ABSTRACT

RC114

Pain and Sedation in 2015: Improving Quality and Patient Outcomes

Sunday, Nov. 29 2:00PM - 3:30PM Location: S504AB

IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Fred E. Shapiro, DO, Boston, MA (*Presenter*) Nothing to Disclose
Richard D. Urman, MD, MBA, Boston, MA (*Presenter*) Nothing to Disclose
Hesham H. Malik, MD, Worcester, MA, (Hesham.Malik@umassmemorial.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) An evidenced-based review of the current literature and how to measure quality and safety related to procedural sedation. 2) Understand the necessity and the role that team training contributes to a safe procedural environment. 3) Review appropriate patient selection for interventional procedures. 4) Review procedural sedation policies, accreditation, pharmacology and patient monitoring. 5) Challenging cases presentation and discussion.

ABSTRACT

The safe and effective sedation of patients during interventional Radiology procedures requires an in depth knowledge of how to administer conscious sedation. Even more important, however, is the skill set to be able to accurately assess each patient's clinical status prior to the procedure, be able to formulate a comprehensive sedation plan, and recognize which patients would be better served by involvement of an Anesthesiologist.This course will review the institutional requirements for providing minimal, moderate or deep sedation. We will also outline how to develop a procedural sedation (PS) policy, including recognition of the role that team training contributes to a safe environment. We will review the use of the Institute for Safety in Office Based Surgery (ISOBS) safety checklist as well as its customization to the IR settingWe will provide an evidenced-based review of the current literature re: QA, risk management, and process improvement using the ISOBS checklist as well as a review of drugs commonly used for procedural sedation.

RC115

Breast Imaging: Fundamentals of Interpretation

Sunday, Nov. 29 2:00PM - 3:30PM Location: S406A

BR DM US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC115A ACR Accreditation

Participants
Brett T. Parkinson, MD, Salt Lake Cty, UT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the history and current relevance of Breast Imaging Accreditation. 2) Be familiar with the scoring standards for breast imaging accreditation, including reasons for failure. 3) Learn about electronic submission of mammography images for accreditation. 4) Appreciate the importance of attaining Breast Imaging Centers of Excellence status.

RC115B Mammography: A Practical Approach to Breast Lesions

Participants
Gilda Cardenosa, MD, Richmond, VA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participants should be able to develop a practical common sense approach to the detection and subsequent evaluation of breast lesions. The participant should be able develop an approach focused on the use of prior films, additional spot compression views and ultrasound in establishing the significance of screen detected lesions and the evaluation of patients presenting with clinical signs and symptoms.

ABSTRACT

A basic, practical and common sense approach in the detection and evaluation of potential breast lessons is presented. As a starting point the need to sit back and review the images globally for potential technical issues that may limit or preclude interpretation, breast size asymmetry, parenchymal asymmetry (focal, global or developing) and the presence of diffuse changes will be discussed. After the images are accessed globally, the active search for the presence of potential masses, calcifications and distortion will be discussed. The importance of using prior films, additional spot compression views, physical examination and ultrasound before making management decisions will be emphasized all towards the goal of minimizing potential delays in the diagnosis of early breast cancers.

RC115C Breast Ultrasound

Participants
Paula B. Gordon, MD, Vancouver, BC (*Presenter*) Stockholder, OncoGenex Pharmaceuticals, Inc ; Scientific Advisory Board, Hologic, Inc; Scientific Advisory Board, RealImaging

LEARNING OBJECTIVES

1) Participants should have greater confidence in performing and interpreting breast ultrasound exams, with an understanding of knobology and post-processing to produce optimal images, and to make use of Doppler to assess breast masses. A brief explanation of elastography will be included. 2) Participants will also gain understanding of the challenges of mammographic-sonographic correlation, and an approach for when correlation is uncertain.

ABSTRACT

Breast ultrasound is an indispensable adjunct to mammography. Using BIRADS criteria, ultrasound can provide critical information that can lead to the earlier diagnosis of cancer, but also allow a definitive benign diagnosis and eliminate the need for invasive procedures. This requires optimal imaging.This course will cover the fundamentals of breast ultrasound including:Equipment selection, set-up and optimization, including the proper use of focal zones, compounding and harmonics, Doppler and elastography.Lesion characterization using BIRADS descriptors will be discussed for simple and complicated cysts, and criteria for distinguishing benign from malignant solid masses.Mamographic/sonographic correlation is key, when the indication for the examination is investigation of a mass seen at screening mammography. This is fairly straightforward when the mass is large and solitary, but more challenging when it is small and/or there are multiple masses. The ultrasound finding has to correspond to the location of the mammographic mass as well as the character of the mass.

RC116

The Aging Radiologist: How to Cope, When to Quit (Sponsored by the RSNA Professionalism Committee) (An Interactive Session)

Sunday, Nov. 29 2:00PM - 3:30PM Location: S402AB

LM PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Donald M. Bachman, MD, Framingham, MA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify physiological and psychological manifestation of aging specific to performance as a radiologist. 2) Institute non-prejudicial evaluation of function and performance of radiologists in their department as they age. 3) Understand economic, health, emotional and professional factors that stimulate radiologists to either continue working or retire. 4) Identify strategies for instituting meaningful and satisfying activities after retirement from active radiology practice.

ABSTRACT

Active Handout:Donald M. Bachman

http://abstract.rsna.org/uploads/2015/12022172/RC116.pdf

Sub-Events

RC116A Coping with the Physical and Mental Changes of Aging

Participants
Donald M. Bachman, MD, Framingham, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC116B Economics of Retirement Finance: Concepts and Misconceptions

Participants
Stephen Chan, MD, Closter, NJ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC116C Professional and Organizational Issues for Senior Radiologists in the Radiology Practice

Participants
Bruce J. Barron, MD, Dunwoody, GA (*Presenter*) Stockholder, Immunomedics, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

Active Handout:Bruce Jonathan Barron

http://abstract.rsna.org/uploads/2015/15003264/RC116C.pdf

RC116D The Radiologist in Retirement: The Importance of Health Insurance, and of New Personal and Professional Endeavors

Participants
Robert A. Schmidt, MD, Chicago, IL (*Presenter*) Medical Advisory Board, Three Palm Software LLC Stockholder, Three Palm Software LLC Spouse, Advisory Board, Three Palm Software LLC Spouse, Stockholder, Three Palm Software LLC Spouse, Medical Advisory Board, Bayer AG Consultant, VuComp, Inc Spouse, Consultant, VuComp, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

RC117

MR-Guided High Intensity Focused Ultrasound (HIFU)

Sunday, Nov. 29 2:00PM - 3:30PM Location: S504CD

MR US IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Pejman Ghanouni, MD, PhD, Stanford, CA, (ghanouni@stanford.edu) (*Moderator*) Nothing to Disclose

Sub-Events

RC117A Neurologic Applications of MR-guided HIFU

Participants
Max Wintermark, MD, Lausanne, Switzerland, (max.wintermark@gmail.com) (*Presenter*) Advisory Board, General Electric Company;

LEARNING OBJECTIVES

1) To understand the neuro applications of HIFU. 2) To understand the challenges of applying HIFU for neuro applications. 3) To review the ongoing trials of neuro applications of HIFU.

ABSTRACT

MR guided focused ultrasound is a new, minimally invasive method of targeted tissue thermal ablation that may be of use to treat central neuropathic pain, essential tremor, Parkinson tremor, and brain tumors. The system has also been used to temporarily disrupt the blood-brain barrier to allow targeted drug delivery to brain tumors. We will discuss current and potential neuro applications of this exciting technology.

RC117B Gynecologic Applications of MR-guided HIFU

Participants
Young-Sun Kim, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Explain pros and cons of MR-guided HIFU in the treatment of uterine fibroids and adenomyosis as compared to other therapeutic modalities 2) Assess important factors in screening MR exams of MR-guided HIFU therapy of uterine fibroids 3) Explain treatment strategy of MR-guided HIFU therapy of uterine fibroids to improve therapeutic outcomes 4) Describe the current limitations of MR-guided HIFU of uterine fibroids and explain how to overcome limitations

ABSTRACT

Uterine fibroid and adenomyosis are the most popular clinical applications of MR-guided HIFU (high-intensity focused ultrasound) therapy. As a totally non-invasive interventional therapeutic modality using small foci of hyperthermia, MR-guided HIFU has pros and cons as compared to other therapeutic modalities. However, owing to its greatest merit of complete non-invasiveness, its clinical adoptions are increasing worldwide.MR-guided HIFU therapy has certain inborn limitations, therefore, appropriate screening in MR-guided HIFU of uterine fibroids is extremely important to improve overall therapeutic outcomes. In order to do so, properties of the target fibroids, safe pathway of sonications, complication-related factors should be well analyzed in screening MR exams. Furthermore, the symptom-relevant fibroid or the portion of fibroid should be recognized and completely ablated.As accumulations of clinical experiences of MR-guided HIFU therapy, there have been several techniques or strategies developed to overcome such limitation or to improve therapeutic efficacy, which will be covered in this presentation.

Handout:Young-Sun Kim

http://abstract.rsna.org/uploads/2015/13012024/RSNA2015_KimYS - handout.pptx

RC117C Body Applications of MR-guided HIFU

Participants
Alessandro Napoli, MD, Rome, Italy (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To become familiar with the basic physical principles of HIFU and the potential of MR guidance. 2) To approach selection criteria in MRI screening examinations for accurate indications and identify contraindications and non-suitable patients. 3) To appreciate current results and potential therapy regimens. 4) To understand recent technical developments and their potential.

ABSTRACT

The concept of ideal tumor surgery is to remove the neoplastic tissue without damaging adjacent normal structures. High-intensity focused ultrasound (HIFU) was developed in the 1940s as a viable thermaltissue ablation approach. In clinical practice, HIFU has been applied to treat a variety of solid benign and malignant lesions, including pancreas, liver, prostate, and breast carcinomas, soft tissue sarcomas, and uterine fibroids. More recently, magnetic resonance guidance has been applied for treatment monitoring during focused ultrasound procedures (magnetic resonance-guided focused ultrasound, MRgFUS). Intraoperative magnetic resonance imaging provides the best possible tumor extension and dynamic control of energy deposition using real-time magnetic

resonance imaging thermometry. The fundamental principles and clinical indications of the MRgFUS technique will be introduced; different treatmentoptions and personal outcomes will be discussed.

RC117D Palliation of Painful Metastases to Bone

Participants
Pejman Ghanouni, MD, PhD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Therapeutic options for palliation of painful metastases to bone. 2) Patient selection for MR guided focused ultrasound palliation of painful bone metastases. 3) Results of Phase III pivotal study of ExAblate MR guided focused ultrasound for palliation of painful bone metastases. 4) Technical aspects of successful patient treatment. 5) Immediate post-treatment imaging-based assessment of results. 6) Future applications of MR guided focused ultrasound for the management of osseous metastatic disease.

ABSTRACT

Cancer patients commonly have metastases to bone; as the survival of cancer patients is prolonged by more effective therapies, the prevalence of patients with metastases to bone is also increasing. Bone metastases are often painful, and often diminish the quality of life. Radiation therapy (RT) is the standard of care for the treatment of bone metastases, but a significant subset of patients do not respond to RT. MR guided focused ultrasound non-invasively achieves localized tissue ablation and provides a proven method of pain relief in patients who do not respond to radiation therapy. MR imaging provides a combination of tumor targeting, real-time monitoring during treatment, and immediate verification of successful treatment. The results of the pivotal Phase III trial that led to FDA approval of the ExAblate MR guided focused ultrasound device for the palliation of painful metastases to bone will be reviewed. In particular, patient selection, the technical aspects of successful patient treatment, and post-treatment assessment of results will be described. Concepts for future development of this technology with regard to the management of osseous metastatic disease will also be presented.

RC118

Imaging Cancer Treatment Complications

Sunday, Nov. 29 2:00PM - 3:30PM Location: N229

CT NM OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC118A Identifying and Distinguishing Treatment Complications on FDG PET/CT

Participants
Gary A. Ulaner, MD, PhD, New York, NY, (ulanerg@mskcc.org) (*Presenter*) Research support, General Electric Company; Research support, F. Hoffmann-La Roche Ltd

LEARNING OBJECTIVES

1) Identify iatrogenic causes of FDG-avidity on FDG PET/CT and distinguish them from FDG-avid malignancy. Iatrogenic causes of FDG-avidity include changes caused by surgery (inflammation at sites of incision, pleurodesis inflammation, transposition of ovaries/testes), radiation (pneumonitis, esophagitis, hepatitis), and drugs (bleomycin pneumonitis, bisphosphonate osteonecrosis, ipilimumab enterocolitis). Familiarity with usual and unusual causes of iatrogenic FDG-avidity will improve accuracy of FDG PET/CT reporting.

ABSTRACT

Fluorine 18 fluorodeoxyglucose (FDG) positron emission tomography / computed tomography (PET/CT) is increasingly used in the initial staging, evaluation of treatment response and surveillance of many malignancies. Uptake of FDG is substantially increased in most malignancies compared with its uptake in normal tissues, and FDG-avidity often leads to cancer detection earlier than abnormalities on anatomic imaging. However, FDG is not a cancer-specific agent, and FDG-avidity can be seen in many benign processes. It can be particularly challenging to discriminate malignancy from benign FDG-avid changes caused by surgery and procedures, radiation, and chemotherapy. FDG-avid lesions caused by surgery and procedures includes inflammation at sites of incision or dissection, inflammation from vascular compromise or surgical retraction, surgical transposition of structures with physiologic FDG-avidity (such as ovaries or testes), and pleurodesis inflammation. Radiation may induce FDG-avid pneumonitis, esophagitis, or hepatitis, as well as osteoradionecrosis or fractures. FDG-avid chemotherapy complications include pneumonitis, osteonecrosis, enterocolitis, and pancreatitis. Granulocyte Colony Stimulating Factor for treatment of bone marrow suppression after chemotherapy induces temporary increases of FDG-avidity in the bone marrow and spleen. In this review we illustrate common and unusual iatrogenic causes of FDG-avidity that can confound FDG PET/CT interpretation. Familiarity with these cases will improve accuracy of FDG PET/CT interpretation.

RC118B Imaging Musculoskeletal Complications

Participants
Brooke R. Beckett, MD, Portland, OR (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To recognize the osseous and soft tissue complications of tumor treatment, specifically those caused by radiation, chemotherapy, and surgery. These include radiation osteitis, osteonecrosis, insufficiency fractures, secondary malignancy, myositis and myonecrosis, and muscle denervation changes.

ABSTRACT

Musculoskeletal complications of tumor treatment are relatively common, often symptomatic, and therefore, an important cause of morbidity in the posttreatment cancer patient. Radiation causes local marrow changes such as osteitis, osteonecrosis and osteopenia, predisposing to insufficiency fractures. It may also cause local muscle damage, most commonly myositis, but occasionally myonecrosis. A rare but especially dreaded complication of radiation is secondary bone or soft tissue sarcoma, which will also be described. Chemotherapy, particularly protocols that include high doses of steroids, predisposes to osteonecrosis. And finally, surgical resection of extremity tumors, either primary or metastatic, may lead to muscle denervation changes. The bones and soft tissues should be carefully reviewed on all surveillance imaging, be it radiographs, CT or MRI, to exclude the presence of these often treatable complications.

RC118C GI Complications

Participants
Priya R. Bhosale, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To recognize the complications caused by chemotherapy and radiation specifically those that occur in the GI tract including the liver and the pancreas. These include perforations, abscess formation, radiation enteritis, insufficiency fractures and secondary malignancy.

ABSTRACT

Several complications can occur in the GI tract following surgery. Similarly chemotherapy can cause a myriad of complications such as perforation, abscesses and enteritis. Radiation therapy can result in radiation enteritis and occurrence of radiation induced

cancer

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Priya R. Bhosale, MD - 2012 Honored Educator

RC118D Pulmonary Complications

Participants
Michelle S. Ginsberg, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To recognize complications in the postoperative thoracic patient in both immediate and late periods. In the immediate period this will include lobar collapse, hemorrhage, pulmonary edema, pneumonia, as well as rarer complications such as bronchopleural fistula, chylothorax and lung torsion. In the later period it is important to follow these patients and to recognize and distinguishing recurrent tumor from treatment changes and new primary tumors.

ABSTRACT

RC120

Fundamentals of Imaging for the Radiation Oncologist

Sunday, Nov. 29 2:00PM - 3:30PM Location: S102C

CH HN NR RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Simon S. Lo, MD, Cleveland, OH (*Moderator*) Research support, Elekta AB;

Sub-Events

RC120A Fundamentals in Radiation Oncology Imaging of Head and Neck Cancer

Participants
Hilda E. Stambuk, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define key anatomy and understand pathways of tumor spread for head and neck cancers. 2) Identify radiographic features of the patterns of tumor involvement. 3) Understand the implications of radiographic imaging in treatment planning.

ABSTRACT

Radiographic imaging is integral to diagnosis, extent of disease assessment, treatment planning and post-treatment surveillance in patients with head and neck cancer. Since the overwhelming majority of cancers of the head and neck are squamous cell carcinoma, these tumors will be the primary focus of the lecture. In addition, choosing the appropriate imaging modality is of vital importance in effective evaluation and therefore the pros and cons of imaging modalities in particular subsites will be presented. The patterns of tumor spread depend on the site of origin of the tumor and will be discussed in detail for some of the common sites such as nasopharynx and oropharynx that are treated primarily with radiation. The implications of pathways of tumor involvement including perineural spread on treatment planning will be emphasized. This lecture will provide radiation oncologists a basic understanding of the role of imaging and will highlight pearls and pitfalls that can influence management.

RC120B Fundamentals in Radiation Oncology Imaging of Thoracic Malignancies

Participants
Matthew M. Harkenrider, MD, Maywood, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the normal imaging changes after precision radiotherapy for lung cancer. 2) To discuss methods of distinguishing recurrence vs. fibrosis after stereotactic radiotherapy. 3) To highlight difficult imaging cases in assessing response after radiotherapy.

ABSTRACT

RC120C Fundamentals in Radiation Oncology Imaging of Skull Base Tumors

Participants
Jason Rockhill, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identifying imaging techniques to help delineate target volumes for skull based tumors. 2) Discuss the challenges of determining target volumes for skull based tumors in the resected and non-resected patient. 3) Review key features to follow by imaging of skull based tumors after radiation therapy.

RC120D Imaging and RT QA in Cancer Clinical Trials: The Advanced Technology Consortium (ATC), the Quality Assurance Review Center (QARC), and the Imaging and Radiation Oncology Core (IROC)

Participants
Thomas J. Fitzgerald, MD, Worcester, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe diagnostic imaging and radiation therapy utilization in clinical trials. 2) Describe the role of quality assurance in imaging and radiation therapy in clinical trials. 3) Describe future QA strategies in the National Clinical Trials Network (NCTN).

RC121

Medical Physics 2.0: Nuclear Imaging

Sunday, Nov. 29 2:00PM - 3:30PM Location: E351

NM PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ehsan Samei, PhD, Durham, NC (*Director*) Nothing to Disclose
Douglas E. Pfeiffer, MS, Boulder, CO (*Director*) Nothing to Disclose

Sub-Events

RC121A Nuclear Imaging Perspective

Participants
Douglas E. Pfeiffer, MS, Boulder, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the history and development of nuclear imaging. 2) Become introduced to the advances of hybrid imaging. 3) Understand the impact of equipment development on medical physics support.

ABSTRACT

Nuclear imaging has not received the attention or development enjoyed by other imaging modalities. Nevertheless, our understanding of nuclear imaging and development of protocols and hybrid systems has led to new requirements for testing and other medical physics support. This presentation will discuss these developments and the impact they have had on the medical physics support needed by nuclear imaging departments.

RC121B Nuclear Imaging 1.0

Participants
Osama R. Mawlawi, PhD, Houston, TX (*Presenter*) Research Grant, Siemens AG; Research Grant, General Electric Company; Research Grant, RadioMedix, Inc

LEARNING OBJECTIVES

1) Learn acceptance testing and commissioning of gamma cameras/SPECT / and PET-CT systems. 2) Describe routine quality control procedures and their frequencies. 3) Become familiar with ACR accreditation of planar, SPECT, and PET systems. 4) Learn about various potential image artifacts of gamma camera, SPECT and PET systems.

ABSTRACT

The aim of this lecture is to provide the audience with an overview of the current medical physics testing procedures that are performed on gamma cameras, SPECT and PET systems. The lecture will be divided into 3 main parts; the first part will describe the tests performed for acceptance testing of these systems while the second part will describe the routine quality control and assurance tests and their frequencies. The last part of the lecture will focus on the ACR accreditation process and the necessary phantom imaging for gamma cameras, SPECT and PET systems. Throughout the lecture, examples of potential image artifacts will be presented.

RC121C Nuclear Imaging 2.0

Participants
Jeffrey Nelson, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with new physics metric and analytics in nuclear imaging. 2) Determine testing implication of emerging technologies in nuclear imaging. 3) Envision the clinical implementation of new physics metrics and analytics.

ABSTRACT

Although the basic science of nuclear imaging has remained relatively unchanged since its inception, advances in instrumentation continue to advance the field into new territories. With a great number of these advances occurring over the past decade, the role and testing strategies of clinical nuclear medicine physicists must evolve in parallel. This presentation is designed to highlight some of the recent advances from a clinical medical physicist perspective and provide ideas and motivation for designing better evaluation strategies. Topics include improvement of traditional physics metrics and analytics, testing implications of hybrid imaging and advanced detector technologies, and strategies for effective implementation into the clinic.

RC122

MRI: Imaging for Treatment Planning

Sunday, Nov. 29 2:00PM - 3:30PM Location: E353A

MR RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Eric Paulson, Milwaukee, WI (*Moderator*) Nothing to Disclose

ABSTRACT

Sub-Events

RC122A MRI for Anatomical Definition

Participants
Eric Paulson, Milwaukee, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the advantages of MRI simulation for anatomical delineation in both external beam radiation therapy and brachytherapy. 2) Understand the differences between images obtained during MRI simulation versus diagnostic MRI. 3) Understand the current solutions to address technical challenges of using MRI for anatomical delineation in Radiation Oncology.

ABSTRACT

MRI is rapidly emerging as a primary imaging modality in Radiation Oncology, fueled by innovations in MRI-guided treatment delivery, MRI simulation systems, and the role of MRI in individualizing and adapting radiation therapy. This course will discuss the advantages and technical challenges of using MRI for anatomical definition in radiation treatment planning. Current solutions to tailor MRI to the unique demands of Radiation Oncology will be explored. Clinical examples illustrating the use of MRI for anatomical delineation in both external beam radiation therapy and brachytherapy will be presented.

RC122B MRI for Functional Definition

Participants
Uulke A. van der Heide, PhD, Amsterdam, Netherlands (*Presenter*) Speaker, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Get an overview of the most relevant functional MRI modalities are available. 2) Understand how they can be used to improve target definition. 3) Understand their limitations and specific concerns for use in radiation oncology.

ABSTRACT

In addition to anatomical imaging, MRI affords a range of functional techniques. Diffusion-weighted MRI images the restriction of water mobility in tissue, thus probing microanatomy. This is used to identify tumors and monitor response to treatment. Dynamic contrast-enhanced MRI shows the tracer kinetics of contrast agents and reflects the characteristics of the microvasculature, such as flow and permeability. These and other techniques can be used to improve target definition, and to characterize tumor tissue for radiotherapy dose painting.

RC123

Molecular Imaging Mini-Course: Basics of Molecular Imaging

Sunday, Nov. 29 2:00PM - 3:30PM Location: E451A

CT MI NM PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

Sub-Events

RC123A Developing Molecular Imaging Agents

Participants
Julie L. Sutcliffe, PhD, Sacramento, CA, (jlsutcliffe@ucdavis.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the ideal properties of a molecular imaging agent. 2) Describe the in vitro validation of the molecular imaging agent. 3) Describe specific examples of successful molecular imaging agents.

RC123B Instrumentation (PET and CT) and Image Reconstruction

Participants
John Sunderland, PhD, Iowa City, IA, (john-sunderland@uiowa.edu) (*Presenter*) Research Grant, Siemens AG

LEARNING OBJECTIVES

1) Identify the primary design components of a modern PET/CT system. 2)Design and implement a PET/CT quality control program to assure high quality and quantitatively accurate clinical imaging. 3) Describe commonly used PET reconstruction algorithms and the practical impact of reconstruction parameters upon image quality and quantitation.

ABSTRACT

Handout:John Sunderland

http://abstract.rsna.org/uploads/2015/15002826/RSNA Physics Recon Talk.pdf

RC123C Basic Clinical Applications

Participants
Hubert J. Vesselle, MD, PhD, Seattle, WA (*Presenter*) Consultant, MIM Software Inc

ABSTRACT

RC124

Pediatric MR: Normal or Not?

Sunday, Nov. 29 2:00PM - 3:30PM Location: N228

GI MK NR MR PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Geetika Khanna, MD, MS, Iowa City, IA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Differentiate normal and abnormal signal intensity patterns of abdominal structures in children. 2) Recognize normal developmental variants that can simulate abdominal pathology.

ABSTRACT

Sub-Events

RC124A Musculoskeletal MR

Participants
Nancy A. Chauvin, MD, Philadelphia, PA, (chauvinn@email.chop.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the MR appearance of normal marrow conversion in the developing skeleton. 2) Identify common pediatric marrow pitfalls that might be mistaken for pathology. 3) Describe the MR appearance of common bone marrow abnormalities in children.

RC124B Brain and Spine

Participants
Tina Y. Poussaint, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Assess MR features associated with normal brain and spine development and maturation. 2) Identify abnormal MR imaging features associated with specific brain diseases and disorders of development in childhood.

ABSTRACT

In pediatric neuroradiology, magnetic resonance imaging is used to assess central nervous system (CNS) disease in the infant, child, and teenager. This requires 1) an understanding of normal brain development and maturation from gestation through adolescence; 2) a technical mastery of the neuroimaging techniques that are used in evaluating brain diseases of childhood; and 3) an overall grasp of the imaging features of numerous brain pathologies, both acquired and congenital. This lecture will focus on the common MR imaging features of the normal pediatric brain and spine and will compare and contrast with MR imaging features in specific brain diseases and disorders of development.

RC124C Abdominal MR

Participants
Geetika Khanna, MD, MS, Iowa City, IA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Differentiate normal and abnormal signal intensity patterns of abdominal structures in children. 2) Recognize normal developmental variants that can simulate abdominal pathology.

RC125

Quantitative Imaging Mini-Course: Promise and Challenges

Sunday, Nov. 29 2:00PM - 3:30PM Location: S502AB

BQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Director*) Institutional research agreement, Siemens AG; Research support, Siemens AG; ; ; ; ;

Sub-Events

RC125A The Perspective of the RSNA Quantitative Imaging Biomarker Alliance (QIBA)

Participants
Edward F. Jackson, PhD, Madison, WI, (efjackson@wisc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the need for and benefits of implementing quantitative image analyses in clinical trials and clinical radiology practice. 2) Understand the activities that RSNA supports to help move the profession of radiology from a primarily qualitative interpretation paradigm to a more quantitative-based interpretation model. 3) Describe the challenges of extracting uniform, standardized quantitative measures from clinical imaging scans. 4) Provide examples of approaches to resolving some of these challenges.

ABSTRACT

The RSNA Strategic Plan strives to advance the radiological sciences and foster the development of new technologies in part by promoting the quantification of imaging results. The added value of quantification in both research and clinical environments is likely to increase as health care initiatives place increased pressure on radiologists to provide decision support for evidence-based care. There remain substantial barriers to the widespread use of quantitative measures in clinical radiology, including an inherently large number of variables that impede validation of specific metrics, diversity of proprietary industry platforms, and lack of acceptance by radiologists. A critical barrier to the implementation of quantitative imaging in radiology is the lack of standardization among vendor platforms. Collaboration in the pre-competitive space is challenging yet crucial to address standardization, and integrating quantitative measurement into workflow will be necessary for wide adoption. The Quantitative Imaging Biomarkers Alliance (QIBA) was officially launched in 2007 as a means to unite researchers, healthcare professionals, and industry stakeholders in the advancement of quantitative imaging. QIBA's mission is to improve the value and practicality of quantitative biomarkers by reducing variability across devices, patients, and time. The four QIBA modality-driven Coordinating Committees (CT, MR, Nuclear Medicine, US) currently oversee nine Biomarker Committees, and associated task forces, that develop QIBA Profiles (i.e., documents) of standardized technical performance specifications for image acquisition, data processing and analysis, and compliance.

RC125B NCI's Quantitative Imaging Network (QIN) Perspective

Participants
Robert J. Nordstrom, PhD, Rockville, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Gain an overview of the NCI Quantitative Imaging Network (QIN). 2) Identify conditions for application submission and review. 3) Identify the needs and benefits for implementing quantitative imaging principles aimed at measurement or prediction of response to therapy in clinical trials. 4) Understand the need for network involvement in these activities.

ABSTRACT

The NCI Quantitative Imaging Network (QIN) is an international association of research teams with the mission to improve the role of quantitative imaging for clinical decision making in oncology by the development and validation of data acquisition, analysis methods, and tools to tailor treatment to individual patients and to predict or monitor the response to drug or radiation therapy. To that end, the teams are moving from the activities of developing and optimizing decision support tools to validating them in clinical environments. This lecture will chart the history of the QIN, show examples of the research results from several teams, and review results of the recent annual meeting.

RC125C Clinical Trial Perspective

Participants
Lawrence H. Schwartz, MD, New York, NY (*Presenter*) Committee member, Celgene Corporation; Committee member, Novartis AG; Committee member, ICON plc; Committee member, BioClinica, Inc

LEARNING OBJECTIVES

1) Gain an overview of the NCI's National Clinical Trials Network (NCTN). 2) Identify the need for Quantitative Imaging within the trial network and in specific trials. 3) Review examples of trial design incorporating Quantitative Imaging. 4) Review recent initiatives in Precision Medicine and the potential role for Quantitative Imaging.

ABSTRACT

Advances in the understanding of the cancer genome has supported the development of targeted therapeutics such as imatinib, erlotinib, crizotinib, and vemurafenib that have changed the approach to cancer treatment, allowing for individualized therapy. In order to study these targeted therapies in an individual manner, cancer clinical trials will need to screen large numbers of patients

in order to identify the subset with the molecular targets that are appropriate to study. In addition, improved efficiencies have been implemented to streamline important central functions related to tissue banks, regulatory approvals and imaging transfer and archiving. The role of imaging both within the NCTN and in precision medicine is undergoing change as well. This will be explored and discussed to understand how we can optimize the role of Quantitative Imaging.

RC127

Accountable Care Organizations: Real World Experience for Radiologists

Sunday, Nov. 29 2:00PM - 3:30PM Location: S105AB

HP

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Clifford J. Belden, MD, Lebanon, NH, (cliffbelden@gmail.com) (*Coordinator*) Nothing to Disclose
Clifford J. Belden, MD, Lebanon, NH, (cliffbelden@gmail.com) (*Moderator*) Nothing to Disclose
John H. Lohnes, MD, Wichita, KS (*Presenter*) Nothing to Disclose
Jonathan Breslau, MD, Sacramento, CA (*Presenter*) Investor, BioIncept, LLC

LEARNING OBJECTIVES

1) Contrast the potential risks and benefits of new payment models vs. traditional fee for service from the patient and radiologist perspective. 2) Explain the impact that new payment models might have on the practice of radiology. 3) Identify the opportunities that new are emerging as payment transitions away from traditional fee for service. 4) Explain how imaging impacts cost risk within health care organizations to support value-based payments. 5) Describe the effect of an increasingly price-conscious consumer on radiology business models.

ABSTRACT

RC129

Should I Scan That Patient? A Very Interactive Session on MR Safety and Regulations (An Interactive Session)

Sunday, Nov. 29 2:00PM - 3:30PM Location: E353C

HP MR SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Jeffrey C. Weinreb, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Emanuel Kanal, MD, Pittsburgh, PA (*Presenter*) Consultant, Boston Scientific Corporation; Consultant, Medtronic, Inc; Consultant, St. Jude Medical, Inc; Consultant, Bayer AG; Investigator, Bracco Group; Royalties, Guerbet SA;

LEARNING OBJECTIVES

1) Analyze the cause and avoidance of a spectrum of common MR safety issues, including burns. 2) List the factors (including regulation and guidelines) which should be evaluated in order to determine the safety of MRI in patients with implants, devices, or foreign objects. 3) Answer questions from the audience concerning MRI safety issues

ABSTRACT

The major potential safety considerations in magnetic resonance imaging relate to those stemming from the static magnetic field, the time varying radiofrequency oscillating magnetic fields, the time varying switched gradient magnetic fields, the contrast agents often utilized in the MR imaging process, sedation/anesthesia and monitoring-related issues unique to the MR imaging environment, and cryogen related potential safety concerns. These can present confounding situations for MR practitioners faced with questions relating to the safety of exposing particular patients and devices, implants, or foreign bodies to MR imaging examinations. This session will introduce and briefly explain the above safety considerations, and highlight specific issues likely to confront MR practitioners in their daily practice by utilizing real-life examples. The methodology and reasoning process used to approach these clinical examples in determining risk-benefit ratios for accepting or rejecting such patients from MR exposure will be stressed. The emphasis will be on not so much the particular examples used, but rather having the attendee feeling more comfortable with the approach to such clinical and research situations in order to better enable them to appropriately address such questions in their own daily practice routines. Audience polling and interaction will be actively utilized throughout this session. This will help enable the attendee to not only hear the opinions of the presenters on the cases being discussed, but also to assess their own responses to the questions being posed relative to that of the other attendees of this session.

RC132

How to Avoid Failure: Qualities of a Successful Leader

Sunday, Nov. 29 2:00PM - 3:30PM Location: E350

LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

1) Develop an understanding of the essential traits and skills required for a leader to be successful, ie traits and states. 2) Develop an understanding of the common errors made by leaders in academic and private practices enabling the attendee to obtain the ? learnings' without the 'lumps. 3) Acquire the skills of succession planning needed to ensure that the success of your organization is sustainable over time and leadership transitions. (This course is part of the Leadership Track)

Sub-Events

RC132A How Leaders Succeed and Fail

Participants
James A. Brink, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title. (This course is part of the Leadership Track)

RC132B Keys to Avoid Failure: Key Qualities of a Successful Leader

Participants
Jonathan S. Lewin, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title. (This course is part of the Leadership Track)

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Jonathan S. Lewin, MD - 2012 Honored Educator

RC132C Leadership

Participants
N. Reed Dunnick, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize historical examples of leaders, in addition to how you can recognize and emulate their favorable characteristics that draw you to their leadership attributes. 2) Understand an overview of leadership references, where and how to access the same, how the related body of knowledge has evolved, and current perspectives concerning leaders and leadership. (This course is part of the Leadership Track)

RC150

MR Imaging-guided Breast Biopsy (Hands-on)

Sunday, Nov. 29 2:00PM - 3:30PM Location: E260

BR MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Amy D. Argus, MD, Cincinnati, OH (*Presenter*) Advisory Board, Devicor Medical Products, Inc
Christopher P. Ho, MD, Atlanta, GA, (christopher.ho@emory.edu) (*Presenter*) Nothing to Disclose
Su-Ju Lee, MD, Cincinnati, OH, (su-ju.lee@uchealth.com) (*Presenter*) Spouse, Stockholder, General Electric Company.
Michelle V. Lee, MD, Saint Louis, MO, (leem@mir.wustl.edu) (*Presenter*) Nothing to Disclose
Mitva J. Patel, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Stamatia V. Destounis, MD, Scottsville, NY (*Presenter*) Research Grant, FUJIFILM Holdings Corporation; Research Grant, Hologic, Inc; Research Grant, QT Ultrasound LLC
Wade C. Hedegard, MD, Rochester, NY (*Presenter*) Nothing to Disclose
Carol H. Lee, MD, New York, NY (*Presenter*) Nothing to Disclose
Colleen H. Neal, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Carol M. Dell, MD, Lexington, KY (*Presenter*) Nothing to Disclose
Roberta A. Jong, MD, Toronto, ON (*Presenter*) Nothing to Disclose
Gary J. Whitman, MD, Houston, TX (*Presenter*) Book contract, Cambridge University Press
Christiane K. Kuhl, MD, Bonn, Germany (*Presenter*) Nothing to Disclose
Hiroyuki Abe, MD, Chicago, IL, (habe@radiology.bsd.uchicago.edu) (*Presenter*) Consultant, Seno Medical Instruments, Inc
Karla A. Sepulveda, MD, Houston, TX (*Presenter*) Nothing to Disclose
Amy L. Kerger, DO, Columbus , OH, (amy.kerger@osumc.edu) (*Presenter*) Nothing to Disclose
Jill J. Schieda, MD, Cleveland, OH, (jschieda@metrohealth.org) (*Presenter*) Nothing to Disclose
Mai A. Elezaby, MD, Madison, WI (*Presenter*) Nothing to Disclose
Amado B. del Rosario, DO, Chicago, IL (*Presenter*) Nothing to Disclose
Andrew Bowman, MD, PhD, Jacksonville, FL (*Presenter*) Nothing to Disclose
Elizabeth R. Deperi, MD, Jacksonville, FL (*Presenter*) Nothing to Disclose
Candice W. Bolan, MD, Jacksonville, FL, (bolan.candice@mayo.edu) (*Presenter*) Nothing to Disclose
Jiyon Lee, MD, New York, NY, (jiyon.lee@nyumc.org) (*Presenter*) Nothing to Disclose
Kirti M. Kulkarni, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Establish criteria for MR Image-guided breast biopsy patient selection. 2) Cultivate a working understanding of MR Image-guided biopsy and needle localization instrumentation and implementation. 3) Basic MR Image-guided biopsy and needle localization parameters and requirements for appropriate coil, needle and approach selection. 4) Discuss practice integration issues. 5) Discuss pearls and pitfalls associated with successful MR Image-guided biopsy.

ABSTRACT

This course is intended to provide both basic didactic instruction and hands-on experience in the application of MRI guided breast biopsy. MRI provides greater sensitivity for detecting breast cancer compared with mammography and ultrasound, although with imperfect specificity. MRI guided biopsy is required to confirm or exclude maligancy for MRI only findings. This course will be devoted to the understanding and identification of the following pertaining to MRI guided biopsy: 1) appropriate patient selection 2) optimal positioning for biopsy 3) target selection and confirmation 4) various biopsy technologies and techniques 5) potential problems and pitfalls.

RC151

Modern Non-invasive Imaging of Cholestatic Liver Diseases

Sunday, Nov. 29 2:00PM - 3:30PM Location: S404AB

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ahmed Ba-Ssalamah, MD, Vienna, Austria (*Presenter*) Nothing to Disclose
Aliya Qayyum, MBBS, Houston, TX (*Presenter*) Nothing to Disclose
Richard M. Gore, MD, Evanston, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe MRI ; MRCP techniques for evaluating biliary disease. 2) List applications in malignant biliary disease. 3) List applications in benign conditions of the biliary tract.

ABSTRACT

This workshop is designed to review the broad spectrum of morphologic and functional features encountered in patients with cholestatic liver diseases involving the intrahepatic and extrahepatic bile ducts and adjacent liver parenchyma, in correlation with the histopathologic hallmark of this group of diseases the so-called "vanishing duct sign. We will start by explaining the role of various different imaging modalities including invasive endoscopic retrograde cholangiopancreatography (ERCP) and non-invasive conventional T2 weighted magnetic resonance cholangiography (MRCP) as well as gadoxetic acid-enhanced T1 MRCP and diffusion weighted images to expedite the evaluation of patients with known or suspected cholestatic liver diseases. Next, we will discuss the broad spectrum of biliary disorders that define cholestatic liver diseases including: primary sclerosing cholangitis (PSC), primary biliary cirrhosis (PBC), ischemic cholangiopathy, chronic rejection following liver transplant, drug-induced liver injury (DILI), infectious secondary cholangitis, cystic fibrosis (CF), etc.

RC152

Techniques for Interventional Sonography and Thermal Ablation (Hands-on)

Sunday, Nov. 29 2:00PM - 3:30PM Location: E264

US IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Stephen C. O'Connor, MD, Springfield, MA (*Moderator*) Nothing to Disclose
Alda F. Cossi, MD, Boston, MA (*Presenter*) Nothing to Disclose
Neil T. Specht, MD, Trumbull, CT (*Presenter*) Nothing to Disclose
Mark L. Lukens, MD, Greensboro, NC (*Presenter*) Nothing to Disclose
Michael A. Mahlon, DO, Tacoma, WA (*Presenter*) Nothing to Disclose
Manish N. Patel, DO, Cincinnati, OH, (manish.patel@cchmc.org) (*Presenter*) Nothing to Disclose
Hollins P. Clark, MD, MS, Winston Salem, NC (*Presenter*) Nothing to Disclose
Mark J. Hogan, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Carmen Gallego, MD, Madrid, Spain, (cgallego@salud.madrid.org) (*Presenter*) Nothing to Disclose
Mabel Garcia-Hidalgo Alonso, MD, Madrid, Spain (*Presenter*) Nothing to Disclose
John D. Lane, MD, Bayside, WI (*Presenter*) Nothing to Disclose
William W. Mayo-Smith, MD, Boston, MA (*Presenter*) Author with royalties, Reed Elsevier; Author with royalties, Cambridge University Press
Humberto G. Rosas, MD, Madison, WI (*Presenter*) Nothing to Disclose
Kristin M. Dittmar, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Nicholas A. Zumberge, MD, Columbus, OH (*Presenter*) Stockholder, Abbvie Inc; Stockholder, Cerner Corporation; Stockholder, Dexcom, Inc; Stockholder, Exact Sciences Corporation; Stockholder, Gilead Sciences, Inc; Stockholder, Merck & Co, Inc; Stockholder, Northwest Biotherapeutics Inc
Veronica J. Rooks, MD, Honolulu, HI (*Presenter*) Nothing to Disclose
James W. Murakami, MD, Columbus, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify basic skills, techniques, and pitfalls of freehand invasive sonography. 2) Discuss and perform basic skills involved in thermal tumor ablation in a live learning model. 3) Perform specific US-guided procedures to include core biopsy, abscess drainage, vascular access, cyst aspiration, soft tissue foreign body removal, and radiofrequency tumor ablation. 4) Incorporate these component skill sets into further life-long learning for expansion of competency and preparation for more advanced interventional sonographic learning opportunities.

ABSTRACT

RC153

Informatics-enabled Peer Review - Lessons from Large Scale Implementations

Sunday, Nov. 29 2:00PM - 3:30PM Location: S404CD

IN LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Jonathan B. Kruskal, MD, PhD, Boston, MA, (jkruskal@bidmc.harvard.edu) (*Moderator*) Author, UpToDate, Inc

LEARNING OBJECTIVES

Sub-Events

RC153A ACR RadPeer Experiences

Participants
Hani H. Abujudeh, MD, MBA, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the components of the ACR RADPEER system. 2) List the strengths and weakness of RADPEER.

ABSTRACT

RADPEER is the ACR peer review system, used by over 17,000 radiologists. It is the largest radiology peer review system in the world. RADPEER has undergone many improvements since first released, and more improvements are coming in the future. RADPEER design includes an interesting case section. Future improvements may be in ways to use RADPEER data for Performance Improvement activities.

RC153B Focus on Workflow Integration

Participants
Tarik K. Alkasab, MD, PhD, Boston, MA, (talkasab@mgh.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe how RADPEER-based systems are typically integrated into radiology workflows. 2) Describe how alternative, group-based peer review systems can be integrated into radiology workflows. 3) Discuss emerging methods of integrating radiology peer review with the radiologist workday.

RC153C Peer Review Analytics

Participants
V. Anik Sahni, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the importance of analytics in the peer review process. 2) Explore the IT solutions available to develop an analytics tool. 3) Discuss data presentation and important key metrics.

RC153D Impact of Peer Review on the Quality of Interpretation

Participants
Jonathan B. Kruskal, MD, PhD, Boston, MA, (jkruskal@bidmc.harvard.edu) (*Presenter*) Author, UpToDate, Inc

LEARNING OBJECTIVES

1) Discuss emerging options for effective peer review. 2) Describe ways in which pee rreview can result in improved perfromancve. 3) Descibe methods for improving the utility and effectiveness of the peer review process.

ABSTRACT

Honored Educators

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Jonathan B. Kruskal, MD, PhD - 2012 Honored Educator

RC154

Precision Medicine through Image Phenotyping

Sunday, Nov. 29 2:00PM - 3:30PM Location: S403A

CA CH VA BQ IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ella A. Kazerooni, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn what the term precision medicine means. 2) To understand how informatics intersects with clinical radiology to enable precision medicine in practice. 3) To learn through concrete examples how informatics based radiology precision medicine impacts health

ABSTRACT

Biomarkers have been emrabced by both the scientific and regulatory communities as surrogates end points for clinical trials, paving the way for their widespread use in medicine. The field of imaging biomarkers has exploded, and the their integration into clinical practice relies heaving on and intersects with the field of bioinformatics.. Once specific biomakers are show to have value, easily integrating them into the digital environment of the radiologist and communcating them to the health care providers and or directly to patients effeiciently and seamlessly is important for their value and impact on health to be realized. Culturally, it is taking radiologists from the era of description and largely qualitative reporting, into a quantitative future state, and leveraging informatics to extract information from imaging alone ot together with data available in the electronic medical record is essential for future sucess in this new world. To get there, understanding the impact of this approach as a value of our services, and standardization of imaging technques along the lines of what the RSNA QIBA initiative is designing, are essential, so that imaging biomarkers are robust, accurate and reprodicbile. Embraching this approach enables and facilitates new appracohes, relationships of imaging and IT researchers, vendors and consumers, to fully realize the possiblities. This course will discuss and describe the overall constructs, and use tangible exams of using this in practice today and for the future.

Sub-Events

RC154A Lung Nodules: Combining Population and Patient Specific Data to Inform Personalized Decision Making

Participants
Eliot L. Siegel, MD, Severna Park, MD (*Presenter*) Research Grant, General Electric Company; Speakers Bureau, Siemens AG; Board of Directors, Carestream Health, Inc; Research Grant, XYBIX Systems, Inc; Research Grant, Steelcase, Inc; Research Grant, Anthro Corp; Research Grant, RedRick Technologies Inc; Research Grant, Evolved Technologies Corporation; Research Grant, Barco nv; Research Grant, Intel Corporation; Research Grant, Dell Inc; Research Grant, Herman Miller, Inc; Research Grant, Virtual Radiology; Research Grant, Anatomical Travelogue, Inc; Medical Advisory Board, Fovia, Inc; Medical Advisory Board, Toshiba Corporation; Medical Advisory Board, McKesson Corporation; Medical Advisory Board, Carestream Health, Inc; Medical Advisory Board, Bayer AG; Research, TeraRecon, Inc ; Medical Advisory Board, Bracco Group; Researcher, Bracco Group; Medical Advisory Board, Merge Healthcare Incorporated; Medical Advisory Board, Microsoft Corporation; Researcher, Microsoft Corporation

LEARNING OBJECTIVES

1) Describe how data from a clinical trial can be repurposed as a decision support tool. 2) List some of the potential techniques that can be utilized to predict likelihood of a malignant nodule from the NLST database. 3) Explain how the Fleischner Guidelines can be personalized utilizing data from NLST and PLCO. 4) Detail the implications for lung screening trials of having access to NLST and PLCO data. 5) Demonstrate how a healthcare enterprise can create their own local reference database using information from their own patient population.

ABSTRACT

The era of personalized/precision medicine offers the potential to utilize patient and lesion specific data to personalize screening and diagnostic work-up, diagnosis, and treatment selection to a particular patient to optimize effectiveness. Although recently, the emphasis has been on utilization of genomic data in personalized medicine, there is a 'gold mine' of useful data in previously conducted clinical trials as well as patient medical electronic records that has, until now, gone largely untapped. The purpose of this presentation is to describe how the screening, diagnosis, and treatment of lung nodules can be personalized utilizing data from the NLST and PLCO clinical trials and how the Fleischner Guidelines and screening criteria for lung cancer can be modified according to the characteristics of an individual patient and individual nodule. The presentation will also include ways in which a facility can collect local data on their own patients to supplement these reference databases with experience from their own patient population.

RC154B Managing Cardiovascular Care through Image Phenotyping Combined with Patient Level Data

Participants
John J. Carr, MD, MS, Nashville, TN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Cardiovascular diseases(CVD) develop over an individual's lifetime. CVD is the number one cause of death and morbidity worldwide. Integrated application of genomics, quantitative imaging and "big data" has the potential to positively transform cardiovascular

prevention and care and reduce the health and economic consequence of CVD. In this talk we will review how easily obtainable imaging biomarkers, already available, can power this change. Measures of cardiac and vascular structure and function as well as body composition provide great insight into and individual's risk of CVD, level of physical activity, diet, vascular health and general well-being.

RCA12

National Library of Medicine: Find Articles You Need: Searching PubMed/MEDLINE Efficiently (Hands-on)

Sunday, Nov. 29 2:00PM - 3:30PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Tony Nguyen, MLIS, Baltimore, MD, (tnguyen@hshsl.umaryland.edu) (*Presenter*) Nothing to Disclose
Holly Ann Burt, MLIS, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how PubMed constructs a query and how to develop and refine effective search strategies in radiology. 2) Use PubMed tools including Clinical Queries, Related Articles, Single Citation Matcher and Loansome Doc. 3) Build focused searches using the Medical Subject Headings (MeSH) vocabulary for radiology and limit searches to radiology-oriented journals. 4) Understand how to save and download citations.

ABSTRACT

This hands-on workshop covers key searching techniques, changes to PubMed, and how to develop effective search strategies for PubMed and MEDLINE. Topics covered include: why keywords don't always give the results you expect, how to limit to specific journals, quick searches to find evidence-based citations, how to access full-text articles, and downloading citations to reference manger programs. The National Library of Medicine (NLM) provides free web access to nearly 24 million citations for biomedical and clinical medical articles through PubMed (available online at PubMed.gov). MEDLINE is a subset of PubMed which includes links to sites providing full text articles and to other related databases and resources.

URL

Handout:Holly Ann Burt

http://abstract.rsna.org/uploads/2015/13013403/2015pubmedRSNA.pdf

RCB12

Creating and Delivering Online and Mobile Education Content: From Online Courses to Interactive iBooks (Hands-on)

Sunday, Nov. 29 2:00PM - 3:30PM Location: S401CD

ED **IN**

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
George L. Shih, MD, MS, New York, NY, (george@cornellradiology.org) (*Moderator*) Consultant, Image Safely, Inc; Stockholder, Image Safely, Inc; Consultant, Angular Health, Inc; Stockholder, Angular Health, Inc;

LEARNING OBJECTIVES

1) Assess the potential of online and mobile e-learning innovations to augment your residents', medical students', and staff's educational curricula. 2) Acquire the domain knowledge to use already available content (eg, PowerPoint presentations) to both create video content and deploy e-learning courses on modern web-based and mobile platforms. 3) Acquire the domain knowledge to create an interactive Apple iBook (electronic books) with text, images, video, and interactive questions.

ABSTRACT

1. From OpenCourseWare to the Khan Academy, and now to Coursera and edX, e-learning has been dramatically improved over the last decade, changing education from the normal classroom into learning done at convenience, and also allows for more creative and engaging content during the typical lecture. Stanford Med published positive initial findings in utilizing video-based lectures in an interactive class setting. Leveraging this new way of learning, requires knowledge about the types of technology and platforms for these courses.2. The workflow required to host an e-learning course can be summarized in 3 steps: (a) creating the educational content, (b) hosting the materials, and (c) making the materials available to the intended audience. E-content today typically consists of lecture slides along with video recordings captured by technology like TechSmith Camtasia (non-free) and Apple Quicktime (free). Once the materials are created and edited, one must choose a suitable hosting platform realistic to the skills and goals of the instructor with options that include coursesites.com, iTunes U, and YouTube / Google Hangouts. Students can then be invited to view the material or the content can be made available to the public.3. Creating and publishing e-books is a great way to share your teaching material as an engaging interactive tool. Publishing in e-book format solves many logistical problems of conventional publishing and the e-book format has interactive features that paper books can't match. We will review the process of creating your own e-book from assembling material to layout design to submitting for e-publication. Specifically Apple iBooks Author software will be used to demonstrate converting an existing Powerpoint presentation or journal publication into an e-book. In addition, the course will go over how to publish with or without DRM (copy-protection) and ways to obtain an ISBN for publishing for sale. Online resources will also be reviewed.

Sub-Events

RCB12A Screencasting Basics on the Desktop and on the iPad

Participants
Ian R. Drexler, MD, MBA, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RCB12B Massive Open Online Course (MOOC) Creation and Hosting

Participants
Kurt T. Teichman, BSc, MEng, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RCB12C Interactive iBooks to Supplement your Online Course

Participants
Alan C. Legasto, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RCC12

IHE Workflow Efficiency from Acquisition to the Report

Sunday, Nov. 29 2:00PM - 3:30PM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Bradley J. Erickson, MD, PhD, Rochester, MN (*Moderator*) Stockholder, Evidentia Health, Inc; Stockholder, OneMedNet Corporation; Stockholder, VoiceIt Technologies, LLC
Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Stockholder, Evidentia Health, Inc; Stockholder, OneMedNet Corporation; Stockholder, VoiceIt Technologies, LLC
Harry Solomon, Barrington, IL (*Presenter*) Employee, General Electric Company
Brad Genereaux, Waterloo, ON, (brad.genereaux@agfa.com) (*Presenter*) Employee, Agfa-Gevaert Group

LEARNING OBJECTIVES

1) Understand the IHE profile for managing radiology report templates (MRRT). 2) Learn about the RSNA template library and how it works together with the MRRT profile so you can easily download and use RSNA templates. 3) Discover how the MRRT profile allows you to take your templates with you when you change systems or change jobs. 4) Review the enhanced features available in MRRT templates.

ABSTRACT

The purpose of this session is to demonstrate how existing and planned IHE profiles can help improve the workflow in a medical imaging department, and help those responsible for its operation, monitor what is happening. Prior IHE profiles focused heavily on traditional RIS and PACS. Newer projects are focused on departmental workflow management and monitoring, as well as exchange of images and reports between medical facilities. We will also describe future possible profiles for utilizing RadLex to improve radiologist efficiency and improve departmental workflow.

RCA13

3D Printing (Hands-on)

Sunday, Nov. 29 4:00PM - 5:30PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Moderator*) Research Grant, Toshiba Corporation;
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Research Grant, Toshiba Corporation;
Jane S. Matsumoto, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Dimitris Mitsouras, PhD, Boston, MA (*Presenter*) Research Grant, Toshiba Corporation; Speakers Bureau, Toshiba Corporation
Andreas Giannopoulos, MD, Boston, MA, (agiannopoulos1@partners.org) (*Presenter*) Nothing to Disclose
Nicole Wake, MS, New York, NY (*Presenter*) Nothing to Disclose
Peter C. Liacouras, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose
Thomas A. Foley, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Kiaran P. McGee, PhD, Rochester, MN (*Presenter*) Nothing to Disclose
Michael W. Itagaki, MD, MBA, Seattle, WA (*Presenter*) Owner, Embodi3D, LLC
Shannon N. Zingula, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Leonid Chepelev, MD,PhD, Ottawa, ON (*Presenter*) Nothing to Disclose
Adnan M. Sheikh, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
AiLi Wang, Ottawa, ON (*Presenter*) Nothing to Disclose
Wilfred Dang, BS, Ottawa, ON (*Presenter*) Nothing to Disclose
Ekin P. Akyuz, BSc, Ottawa, ON (*Presenter*) Nothing to Disclose
Taryn Hodgdon, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carlos H. Torres, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Anji Tang, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the Standard Tessellation Language (STL) file format that is used in 3D priting. 2) Be exposed to a software package to enable segmentation of DICOM images using semi-automated and manual segmentation algorithms, allowing the user to demarcate desired parts. The most commonly used tools are thresholding, region growing, and manual sculpting. 3) Learn refinement of an output STL output so that it can be optimized for accurate printing of the desired anatomy and pathology. This step uses Computer Aided Design (CAD) software is used to perform steps such as "wrapping" and "smoothing" to make the model more homogeneous.

ABSTRACT

"3D printing" refers to fabrication of a tangible object from a digital file by a 3D printer. Materials are deposited layer-by-layer and then fused to form the final object. There are several 3D printing technologies that share similarities but differ in speed, cost, and resolution of the product. Digital Imaging and Communications in Medicine (DICOM) image files cannot be used directly for 3D printing; further steps are necessary to make them readable by 3D printers. The purpose of this hands-on course is to convert a set of DICOM files into a 3D printed model through a series of simple steps. Some of the initial post-processing steps may be familiar to the radiologist, as they share common features with 3D visualization tools that are used for image post-processing tasks such as 3D volume rendering. However, some are relatively or completely new to radiologists, including the manipulation of files in Standard Tessellation Language (STL). It is the STL format that is read by the 3D printer and used to output the hand held part of the patient's anatomy. This 90 minute session will begin with a DICOM file and will proceed through the steps to create a printable STL file. An extensive training manual will be provided before the meeting. It is highly recommended that participants review the training manual to optimize the experience at the workstation.

URL

Active Handout:Frank John Rybicki

http://abstract.rsna.org/uploads/2015/14003455/Active RCA13.pdf

RCC13

Optimizing PowerPoint Slides

Sunday, Nov. 29 4:00PM - 5:30PM Location: S501ABC

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
William J. Weadock, MD, Ann Arbor, MI (*Presenter*) Owner, Weadock Software, LLC
Sarah C. Abate, BS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the components of an optimal slide presentation. 2) Learn about common errors made in slide preparation and how they can be avoided. 3) Learn about how to improve the quality of a presentation by using optimal different slide backgrounds, font size and color, and image sizes. 4) Learn tips to ensure a smooth presentation.

ABSTRACT

Electronic presentations are very common in radiology practice. This hands-on demonstration and questions and answer session will show attendees how to optimize their presentations. The focus will be on the use of slide templates, color selection (font and background), font and image size, and animations. Additional review of image and video display and management will be covered. Demonstrations will include tips to decrease time creating and modifying presentations. Bring your questions!

SPDL20

RSNA Diagnosis Live™: 'Bo you don't know Didley' - Test Your Diagnostic Skills at the Crack of Dawn

Monday, Nov. 30 7:15AM - 8:15AM Location: E451B

CA GI HN MK NR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Adam E. Flanders, MD, Penn Valley, PA (*Presenter*) Nothing to Disclose
Christopher G. Roth, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Sandeep P. Deshmukh, MD, Philadelphia, PA, (sandeep.deshmukh@jefferson.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will be introduced to a series of radiology case studies via an interactive team game approach designed to encourage "active" consumption of educational content. 2) The participant will be able to use their mobile wireless device (tablet, phone, laptop) to electronically respond to various imaging case challenges; participants will be able to monitor their individual and team performance in real time. 3) The attendee will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

SPSC20

Controversy Session: Enteral Contrast for CT...High or Dry?

Monday, Nov. 30 7:15AM - 8:15AM Location: E451A

GI CT

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants
Kumaresan Sandrasegaran, MD, Carmel, IN (*Moderator*) Nothing to Disclose

Sub-Events

SPSC20A Pro Enteral Contrast

Participants
Perry J. Pickhardt, MD, Madison, WI (*Presenter*) Co-founder, VirtuoCTC, LLC; Stockholder, Cellectar Biosciences, Inc; Research Consultant, Bracco Group; Research Consultant, KIT ; Research Grant, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Identify the advantages and disadvantages for the use of enteral contrast at CT. 2) Compare and contrast the various types of enteral contrast (positive, neutral, and negative). 3) Assess the appropriateness of the use of enteral contrast according to specific study indication.

ABSTRACT

N/A

URL

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Perry J. Pickhardt, MD - 2014 Honored Educator

SPSC20B Against Enteral Contrast for Most CT Indications

Participants
Benjamin M. Yeh, MD, San Francisco, CA, (ben.yeh@ucsf.edu) (*Presenter*) Research Grant, General Electric Company; Author with royalties, Oxford University Press; Shareholder, Nextrast, Inc;

LEARNING OBJECTIVES

1) Review the evidence for the use and non-use of positive oral contrast material for CT will be reviewed. 2) Discuss artifacts and interpretive pitfalls arising from positive oral contrast use at CT. 3) Understand issues of patient tolerance and compliance with positive oral contrast use. 4) Explore specific scenarios where non-use of positive oral contrast outweighs the use of oral contrast will be explored, including in the emergency room setting, and when bowel pathology such as ischemia and inflammation is of concern.

ABSTRACT

As our multidetector CT technology improves and our understanding of imaging technique progresses, the use or non-use of positive oral contrast for CT imaging is evolving. Although positive oral contrast is used by the great majority of radiologists for routine CT imaging and has undisputed value, specific scenarios are emerging where positive oral contrast usage is harmful to accurate imaging diagnosis and patient care. This discussion will explore the economic, logistical, interpretive, and side effect issues of positive oral contrast usage in the modern CT practice. A re-examination of when it is appropriate not to use positive oral contrast will be discussed, and include rapid patient triage in the emergency setting, certain subsets of abdominopelvic imaging, and patient tolerance.The economic and radiation dose cost of positive oral contrast use will also be explored.

URL

Active Handout:Benjamin M. Yeh

http://abstract.rsna.org/uploads/2015/15003369/SPSC20B.pdf

SPSH20

Hot Topic Session: PET/MR and Hyperpolarized MR for GU Imaging

Monday, Nov. 30 7:15AM - 8:15AM Location: E450B

GU MR NM OI

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Zhen J. Wang, MD, Hillsborough, CA, (jane.wang@ucsf.edu) (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To become familiar with current PET-MR imaging strategies. 2) To learn the current and future applications of PET-MR in genitourinary oncology including gynecological cancers and prostate cancer. 3) To understand the principles of hyperpolarized carbon-13 MR metabolic imaging 4) To learn the clinical utility of hyperpolarized carbon-13 MR for measuring prostate cancer aggressiveness and response to therapy

ABSTRACT

URL

Sub-Events

SPSH20A PET/MRI of Gynecological Malignancies

Participants
Raj M. Paspulati, MD, Cleveland, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) PET-MRI protocol and workflow for Gynecological cancer. 2) Role of PET-MRI in Gynecological cancer staging, treatment planning and follow up for treatment response. 3) PET-MR Imaging pit falls and limitations.

SPSH20B Imaging of Prostate Cancer: Potential of PET/MRI with Tracers beyond FDG

Participants
Matthias Roethke, MD, Heidelberg, Germany (*Presenter*) Speaker, Siemens AG

LEARNING OBJECTIVES

View learning objectives under main course title.

Handout:Matthias Roethke

http://abstract.rsna.org/uploads/2015/15006404/Roethke Prostate RSNA handout.pdf

SPSH20C Hyperpolarized 13C MR Clinical Trials of Prostate Cancer

Participants
John Kurhanewicz, PhD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSAS21

Global Health (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Monday, Nov. 30 8:30AM - 10:00AM Location: S105AB

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Alexander Yule, DSc, Cardiff, United Kingdom (*Moderator*) Nothing to Disclose
Susan Crowley, MEd, RT, Toronto, ON (*Moderator*) Nothing to Disclose

Sub-Events

MSAS21A Challenges of Medical Imaging in Resource Limited Communities

Participants
Melissa Culp, MEd, RT(R)(MR), Chevy Chase, MD, (mculp@rad-aid.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will learn about challenges related to working in a resource limited community. 2) The participant will understand differences in radiology workflow that result from imaging in a resource limited community. 3) The participant will comprehend the importance of working with and recognizing partners involved in a radiology global health initiative to address challenges and have successful outcomes.

ABSTRACT

Radiology enterprises in low-resource settings often have unique challenges as a result of limited infrastructure and funding, difficulty obtaining service and maintenance for equipment, and the need for human resource and capacity building. Successful radiology global health initiatives in resource limited environments require an objective analysis of site Radiology Readiness and open communication with partners bilaterally. As a 501(c)(3) non-profit with United Nations affiliation and official relations with the World Health Organization, RAD-AID International is uniquely positioned to work with local stakeholders, professional organizations, and volunteers to address these needs and have successful outcomes.

MSAS21B Role of Medical Imaging on Global Health

Participants
Miriam N. Mikhail, MD, Geneva, Switzerland (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Participants will learn about the role of the WHO in radiology-related public health initiatives, including support of imaging referral guidelines and the launch of AFROSAFE (African counterpart of Image Gently/Image Wisely and EUROSAFE). 2) Participants will learn about the potential for continued and greater collaboration of the WHO and radiology entities: synergies in dealing with priority public health trends.

ABSTRACT

The World Health Organization (WHO), a U.N. agency with a mandate as the directing and coordinating authority of international public health work, facilitates collaboration to promote global health in a strategic, harmonized fashion concordant with specific core functions. With radiology in mind, this presentation provides an overview of some priority public health issues and trends, the increase in global non-communicable diseases and the proportionate need for greater availability of medical imaging, governance and the importance of WHO interaction with radiology-related professional societies and organizations, recurrent problems encountered during medical equipment donations, priority design needs for imaging equipment for use in low-resource settings, radiation protection initiatives, and a few words on the Ebola epidemic and personal protective equipment.

Active Handout:Miriam Niveen Mikhail

http://abstract.rsna.org/uploads/2015/15002336/Active Handout_Radiation Safety Education links v2 (1).pdf

MSAS21C Organizational Support for Global Imaging Needs

Participants
Jonathan Mazal, MS, RRA, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will learn about the role of radiology-specific professional societies in global health. 2) The participant will understand the strategy for seeking and lending expert opinion on global imaging guidelines from an international membership base. 3) The participant will comprehend the importance of having professional societies present to advocate on behalf of imaging professionals on an international level.

ABSTRACT

National radiology-specific professional societies often work with their local governments, representing the perspectives and needs of their members to ensure they are provided with the necessary tools and working conditions required to provide optimal care to their patients. The same proves true on the international level in regards to development and dissemination of guidelines impacting the practice of radiology within a global health perspective. As one of the leading organizations advocating on behalf of imaging

professionals in over 90 countries worldwide, the International Society of Radiographers and Radiologic Technologists (ISRRT) holds official relations with the United Nations and routinely convenes with their key health related agencies on matters affecting the field of radiology.

MSCM21

Case-based Review of Magnetic Resonance (An Interactive Session)

Monday, Nov. 30 8:30AM - 10:00AM Location: S100AB

GI GU MK MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
John R. Leyendecker, MD, Dallas, TX (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be familiar with the MRI appearance of common musculoskeletal derangements of the hip. 2) Develop a differential diagnosis for musculoskeletal soft tissue tumors based on MRI appearance. 3) Distinguish between common benign and malignant liver neoplasms. 4) Be familiar with the typical MRI appearance of select female pelvic disorders.

ABSTRACT

This session will help attendees recognize and manage select, commonly encountered musculoskeletal and abdominopelvic abnormalities based on their MRI appearances using a case-based, interactive format.

Sub-Events

MSCM21A Musculoskeletal MRI of the Hip and Pelvis

Participants
Mini N. Pathria, MD, San Diego, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Active Handout:Mini Nutan Pathria

http://abstract.rsna.org/uploads/2015/15002720/Active -MSCM21A.pdf

MSCM21B MRI of Soft Tissue Masses of the Extremities

Participants
Kirkland W. Davis, MD, Madison, WI, (kdavis@uwhealth.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Distinguish characteristic extremity soft tissue masses on the basis of signal characteristics, such as high signal on T1-weighted images or low signal on all sequences.

ABSTRACT

MSCM21C MRI of the Liver

Participants
Nicole M. Hindman, MD, New York, NY, (Nicole.Hindman@nyumc.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize and analyze benign but unusual liver lesions. 2) Analyze uncommon presentations of liver lesions. 3) Recognize neoplastic mimics of benign lesions in the liver (eg, a colon metastasis mimicking a hemangioma) .

ABSTRACT

This session will cover common and uncommon presentations of liver lesions on several modalities (ultrasound, CT and MRI). A brief interactive review of common, but atypical presentations of both benign and malignant liver lesions will be presented. Malignant mimics of benign liver lesions will also be shown, with features that should be analyzed in order to better characterize the lesion, and appropriately raise concern (eg, for a metastasis or intrahepatic cholangiocarcinoma instead of a benign hemangioma). Recent advances in liver lesion characterization will be covered.

MSCM21D MRI of the Female Pelvic Organs

Participants
Christine O. Menias, MD, Scottsdale, AZ, (menias.christine@mayo.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Honored Educators

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educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Christine O. Menias, MD - 2013 Honored Educator
Christine O. Menias, MD - 2014 Honored Educator
Christine O. Menias, MD - 2015 Honored Educator

MSMC21

Cardiac CT Mentored Case Review: Part I (In Conjunction with the North American Society for Cardiac Imaging) (An Interactive Session)

Monday, Nov. 30 8:30AM - 10:00AM Location: S406A

CA CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Pamela K. Woodard, MD, Saint Louis, MO (*Director*) Research Consultant, Bristol-Myers Squibb Company; Research Grant, Astellas Group; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Bayer AG; Research agreement, Siemens AG; Research Grant, Actelion Ltd; Research Grant, Guerbet SA; ; ;
Pamela K. Woodard, MD, Saint Louis, MO (*Moderator*) Research Consultant, Bristol-Myers Squibb Company; Research Grant, Astellas Group; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Bayer AG; Research agreement, Siemens AG; Research Grant, Actelion Ltd; Research Grant, Guerbet SA; ; ;
Jill E. Jacobs, MD, New York, NY (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify cardiac and coronary artery anatomy. 2) Recognize cardiac disease processes, including coronary atherosclerosis, as diagnosed on CT. 3) Understand methods of cardiac CT and coronary CT angiography post-processing.

Sub-Events

MSMC21A Normal Coronal Anatomy

Participants
Shawn D. Teague, MD, Indianapolis, IN (*Presenter*) Stockholder, Apple Inc

LEARNING OBJECTIVES

1) Recognize normal anatomy and common variants of the coronary arteries. 2) Understand the unique advantages and disadvantages of CT for coronary artery evaluation. 3) Describe the current State-of-the-Art capabilities for CT in coronary artery evaluation.

ABSTRACT

MSMC21B Anomalous Coronary Arteries

Participants
Cylen Javidan-Nejad, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Using Coronary Artery CT cases to review anomalous origins of the coronary arteries

MSMI21

Molecular Imaging Symposium: Basics of Molecular Imaging

Monday, Nov. 30 8:30AM - 10:00AM Location: S405AB

BQ MI MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Jan Grimm, MD, PhD, New York, NY (*Moderator*) Nothing to Disclose
Zaver M. Bhujwalla, PhD, Baltimore, MD (*Moderator*) Nothing to Disclose

Sub-Events

MSMI21A MI Using Radioactive Tracers

Participants
Jan Grimm, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) In this course, we will discuss the various radio tracers and their applications in Molecular Imaging studies. Participants will understand in which situations to use which radio tracers, what to consider when developing the imaging construct and what controls to obtain for nuclear imaging studies. Examples will contain imaging with small molecules, with antibodies and nanoparticles as well as with cells in order to provide the participants with examples how o correctly perform their imaging studies. Most of the examples will be from the oncology field but their underlying principles are universally applicable to other areas as well.

ABSTRACT

Nuclear Imaging is currently the only true "molecular" imaging method utilized in clinic. It offers quantitative imaging of biological processes in vivo. Therefore, it is not surprising that it is also highly frequented in preclinical imaging applications since it is currently the only true quantitative imaging method. Multiple agents have been developed, predominantly for PET imaging but also for SPECT imaging.In this talk, we will discuss the application of radio tracers to molecular imaging and what to consider. Common pitfalls and mistakes as well as required measures to avoid these will be discussed. We will discuss various examples of imaging constructs, ranging from small molecules to antibodies, nanoparticles and even cells. In addition, the imaging modalities will also briefly discussed, including PET, SPECT and Cherenkov imaging.

MSMI21B Molecular MRI and MRS

Participants
Zaver M. Bhujwalla, PhD, Baltimore, MD, (zbhujwa1@jhmi.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

To define the role of MRI and MRS in molecular and functional imaging and cover specific applications in disease processes. The primary focus will be advances in novel theranostic approaches for precision medicine.

ABSTRACT

With an array of functional imaging capabilities, magnetic resonance imaging (MRI) and spectroscopy (MRS) techniques are valuable in obtaining functional information, but the sensitivity of detection is limited to the 0.1-1 mM range for contrast agents and metabolites, respectively. Nevertheless, MRI and MRS are finding important applications in providing wide-ranging capabilities to tackle key questions in cancer and other diseases with a 'molecular-functional' approach. An overview of these capabilities and examples of MR molecular and functional imaging applications will be presented with a focus on theranostic imaging for precision medicine.

MSMI21C Nanoparticles

Participants
Heike E. Daldrup-Link, MD, Palo Alto, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand important safety aspects of USPIO. 2) To recognize the value of immediately clinically applicable iron oxide nanoparticles for tumor MR imaging applications. 3) To learn about clinically relevant new developments of theranostic USPIO.

ABSTRACT

Nanoparticles Nanoscale materials can be employed to develop novel platforms for understanding, diagnosing, and treating diseases. Integrating nanomedicine with novel multi-modality imaging technologies spurs the development of new personalized diagnostic tests and theranostic (combined diagnostic and therapeutic) procedures. This presentation will provide an overview over the safety, diagnostic applications and theranostic developments of clinically applicable ultrasmall superparamagnetic iron oxide nanoparticles (USPIO). USPIO which are currently used for clinical applications include ferumoxytol (Feraheme), an FDA-approved iron supplement, and ferumoxtran-10 (Combidex/Sinerem), which is currently undergoing renewed clinical trials in Europe. Safety considerations for these agents will be discussed. Both compounds provide long lasting blood pool enhancement, which can be used for MR angiographies and tissue perfusion studies. Subsequently, USPIO are slowly phagocytosed by macrophages in the reticuloendothelial system (RES), which can be used to improve MRI detection of tumors in liver, spleen, lymph nodes and bone

marrow. A slow phagocytosis by macrophages in inflammations and high grade tumors can be used to grade the severity of the disease process and monitor new immune-modulating therapies. Novel developments include synthesis of multi-functional nanoparticles, which can be detected with two or more imaging modalities, as well as clinically applicable approaches for in vivo tracking of stem cell therapies. Since USPIO are not associated with any risk of nephrogenic sclerosis, they can be used as alternative contrast agents to gadolinium chelates in patients with renal insufficiency or in patients in whom creatinine lab values are not available. Ongoing pre-clinical developments include the development of improved, targeted and activatable nanoparticle formulations, which can further improve sensitivity, specificity and theranostic imaging capabilities.

MSMI21D Contrast Ultrasound

Participants
Steven B. Feinstein, MD, Chicago, IL (*Presenter*) Research support, General Electric Company; Consultant, General Electric Company; Investor, SonoGene LLC;

LEARNING OBJECTIVES

1) Inform: Clinical utility and safety of contrast enhanced ultrasound (CEUS) imaging. 2) Educate: Current diagnostic and therapeutic approaches. 3) Introduce: Newer concepts for combined diagnostic and therapeutic applications.

MSMI21E Quantitative Imaging Biomarkers

Participants
Richard L. Wahl, MD, Saint Louis, MO (*Presenter*) Research Consultant, Nihon Medi-Physics Co, Ltd;

LEARNING OBJECTIVES

1) Identify at least one method of assessing anatomic tumor response quantitatively. 2) Identify at least one method of assessing metabolic tumor response using FDG PET quantitative. 3) Identify an MRI quantitative metric which is associated with cellularity of biological processes.

ABSTRACT

Radiology initially developed as an analog imaging method in which non quantitative data were interpreted in a 'qualitative and subjective' manner. This approach has worked well, but modern imaging also is digital, quantitative and has the opportunity for more quantitative and objective interpretations. This lecture will focus on a few areas in which quantitative imaging is augmenting qualitative image assessments to lead to more precise interpretation of images. Examples of such an approach can include measuremental of tumor 'metabolic' activity using formalisms such as PERCIST 1.0; methods of assessment of tumor size and volumes using the RECIST 1.1 and emerging formalisms and metrics of tumor heterogeneity, density, receptor density, diffusion, vascular permeability and elasticity using techniques incuding PET/SPECT, MRI, CT and ultrasound. With quantitative imaging, the opportunity to move from qualitative methods to precise in vivo quantitative pheontyping is a real one, with a quantitative 'phenome' complementing other 'omics' such as genomics. However, the quality of quantitation may vary and close attention to technical methodologies and process are required to have reliable and accurate quantitation. The RSNA QIBA effort will be briefly reviewed as one approach to achieve precise quantiative phenotyping. Examples of the use of quantitative phenotyping to inform patient management will be discussed.

Honored Educators

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Richard L. Wahl, MD - 2013 Honored Educator

MSRO21

BOOST: Gynecology-Oncology Anatomy - Radiologic Evaluation of Pelvic Malignancies in the Era of Imaging Biomarkers (An Interactive Session)

Monday, Nov. 30 8:30AM - 10:00AM Location: S103AB

GU BQ RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Saurabh Gupta, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose
Robert S. Hellman, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose
Paul M. Knechtges, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose
Mark D. Hohenwalter, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose
Beth A. Erickson, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review uterine/cervical anatomy and current anatomic imaging methods for the evaluation of pelvic malignancy. 2) Review the current role of PET in the imaging of pelvic malignancy. 3) Discuss the growing role of imaging biomarkers (e.g. diffusion weighted imaging and perfusion imaging) in determining prognosis and treatment response for pelvic malignancies.

MSRO24

BOOST: Head and Neck-Oncology Anatomy (An Interactive Session)

Monday, Nov. 30 8:30AM - 10:00AM Location: S103CD

HN NR RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

MSRO24A Imaging of Larynx and Hypopharynx: Applied Anatomy

Participants
Suresh K. Mukherji, MD, Northville, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the normal anatomy of the larynx. 2) Discuss the spread patterns of the different primary sites of the larynx. 3) Explain the information that imaging provides that directly affects staging and management.

ABSTRACT

This session will demonstrate the value of laryngeal imaging. This talk will review the normal anatomy of the larynx. The talk will also discuss the spread patterns of the different primary sites of the larynx and illustrate the information that imaging provides that directly affects staging and management of laryngeal cancer.

MSRO24B Current Concepts and Controversies in Contouring for Treating Laryngeal Carcinoma

Participants
Sung Kim, MD, New Brunswick, NJ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review anatomy of larynx as it relates to patterns of spread of squamous cell carcinoma. 2) Discuss how patterns of spread affects how to contour larynx for radiation therapy.

MSRO24C QandA

Participants

MSRO24D Imaging of the Oral Cavity and Oropharynx: Applied Anatomy

Participants
Suresh K. Mukherji, MD, Northville, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the normal anatomy of the oral cavity and oropharynx. 2) Illustrate the normal spread patterns of the various subsites of the oral cavity and oropharynx. 3) Explain the information that imaging provides that directly affects staging and management.

ABSTRACT

Imaging plays a crucial role in evaluating the evaluating the primary site. The information provided on pre-treatment imaging directly affects the stage of the tumor and provides information regarding management and treatment that cannot be ascertained through physical exam or staging. This talk will review the normal anatomy and malignancies involving the oral cavity and oropharynx. The presentation will also provide information on technique and provide a "checklist" of information that should be included in the radiologist's report that will help determine treatment and management.

MSRO24E Current Concepts and Controversies in Contouring and Treatment of Oral Cavity/Oropharynx Carcinoma

Participants
Clifton D. Fuller, MD, PhD, Houston, TX, (cdfuller@mdanderson.org) (*Presenter*) In-kind support, General Electric Company; Research Grant, Elekta AB; ; ;

LEARNING OBJECTIVES

1) Review imaging anatomy of or pharynx as it relates to patterns of spread of squamous cell carcinoma. 2) Discuss oropharyngeal contouring patterns for radiation therapy. 3) Discuss treatment indications for surgery, radiotherapy, and chemoradiotherapy and the requisite contouring guidelines across oropharynx cancer staging.

MSRO24F QandA

Participants

RC201

Chest Series: Lung Cancer Screening

Monday, Nov. 30 8:30AM - 12:00PM Location: S406B

CH CT

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

Participants
Caroline Chiles, MD, Winston-Salem, NC (*Moderator*) Nothing to Disclose
Jane P. Ko, MD, New York, NY (*Moderator*) Speaker, Siemens AG

LEARNING OBJECTIVES

1) Compare evidence LDCT screening for lung cancer from the North American and European trials. 2) Classify screen-detected lung nodules and recommend appropriate management. 3) Incorporate the essential elements of a clinical lung cancer screening program. 4) Critique the evidence for and against screening patients who do not meet current eligibility criteria for LDCT screening.

Sub-Events

RC201-01 Current Evidence for Lung Cancer Screening: The North American Perspective

Monday, Nov. 30 8:30AM - 8:50AM Location: S406B

Participants
Caroline Chiles, MD, Winston-Salem, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Compare evidence LDCT screening for lung cancer from the North American and European trials. 2) Classify screen-detected lung nodules and recommend appropriate management. 3) Incorporate the essential elements of a clinical lung cancer screening program. 4) Critique the evidence for and against screening patients who do not meet current eligibility criteria for LDCT screening.

ABSTRACT

There is an increasing body of evidence for low-dose CT (LDCT) screening for lung cancer. This multisession course will review data from North American and European trials, with emphasis on mortality reduction, cost-effectiveness, and stage shift; classification of lung nodules by appearance and size, measurement of nodule growth, and management strategies; elements of an effective clinical screening program; and the evidence for limiting screening to patients who meet current eligibility criteria based on age and smoking history versus including patients on the basis of expanded criteria.

RC201-02 Ultra-low-dose Chest CT for Lung Cancer Screening Using Full Iterative Reconstruction: Feasibility Study

Monday, Nov. 30 8:50AM - 9:00AM Location: S406B

Participants
Masayo Fujita, Hiroshima, Japan (*Presenter*) Nothing to Disclose
Toru Higaki, PhD, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshikazu Awaya, MD, Miyoshi, Japan (*Abstract Co-Author*) Nothing to Disclose
Yuko Nakamura, MD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
So Tsushima, Otawara, Japan (*Abstract Co-Author*) Employee, Toshiba Corporation
Kazuo Awai, MD, Hiroshima, Japan (*Abstract Co-Author*) Research Grant, Toshiba Corporation; Research Grant, Hitachi, Ltd; Research Grant, Bayer AG; Reseach Grant, DAIICHI SANKYO Group; Medical Advisor, DAIICHI SANKYO Group; Research Grant, Eisai Co, Ltd; Research Grant, Nemoto-Kyourindo; ; ; ; ;
Makoto Iida, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare the detectability of pulmonary nodules on low-dose CT (LDCT) scans with hybrid iterative reconstruction (effective radiation dose about 2.0 mSv) and ultra-low dose CT (U-LDCT, about 0.2 mSv) scans and to investigate the feasibility of U-LDCT for lung cancer screening.

METHOD AND MATERIALS

Institutional review board approval and informed consent from all 50 subjects were obtained. The subjects (median age 64 years, range 53-75 years; smoking history median 46.5 packs/year, range 34.5 - 100 packs) underwent CT lung cancer screening with both LDCT and U-LDCT on a 320 detector-row scanner (Aquilion One, Toshiba). For LDCT we used our routine scan parameters for lung cancer screening (120 kVp, tube current regulated automatically [noise index 22], detector configuration 80 x 0.5 mm, pitch factor 1.39, reconstruction slice thickness and interval 2.0 mm). LDCT images were routinely reconstructed with hybrid iterative reconstruction (AIDR 3D, Toshiba). For U-LDCT we applied 5 mAs; the other parameters were as for LDCT. U-LDCT images were reconstructed with newly-developed full iterative reconstruction (FIRST, Toshiba).By consensus, 2 radiologists visually evaluated U-LDCT images as to pulmonary nodules (diameter ≥ 4 mm) identified on LDCT images using a 3-point subjective scale where grade 3 = the nature of the nodule, i.e. solid, part-solid, ground glass (SN, p-SN, GGN), could be accurately identified, grade 2 = the nodule, but not its nature, could be easily identified, and grade 1 = the nodule could not be identified.

RESULTS

In the 50 subjects we identified 75 nodules on LDCT images (SN, n=20; p-SN, n=5; GGN, n=50). Of these, all 20 SNs were classified as grade 3, all 5 p-SNs as grade 3, and 30 of the 50 GGNs as grade 3, 15 as grade 2, and 5 as grade 1 (60-, 30-, and 10%, respectively).

CONCLUSION

The detectability of SNs and p-SNs on U-LDCT images with full IR was comparable to LDCT images. However, 10% of GGNs were not detected on U-LDCT images.

CLINICAL RELEVANCE/APPLICATION

As the detecability of pulmonary nodules was almost comparable on LDCT- and U-LDCT images with full IR except GGNs, lung cancer screening using U-LDCT may be feasible.

RC201-03 Current Evidence for Lung Cancer Screening - The European Perspective

Monday, Nov. 30 9:00AM - 9:20AM Location: S406B

Participants
Marjolein A. Heuvelmans, BSc, Groningen, Netherlands, (m.a.heuvelmans@umcg.nl) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Compare evidence LDCT screening for lung cancer from the North American and European trials. 2) Classify screen-detected lung nodules and recommend appropriate management. 3) Incorporate the essential elements of a clinical lung cancer screening program. 4) Critique the evidence for and against screening patients who do not meet current eligibility criteria for LDCT screening.

RC201-04 The Role of Volume and Predicted Volume-doubling Time in Differentiating Benign from Potential Malignant New Nodules at Incidence CT Lung Cancer Screening

Monday, Nov. 30 9:20AM - 9:30AM Location: S406B

Participants
Joan E. Walter, BSc, Groningen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Marjolein A. Heuvelmans, BSc, Groningen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Geertruida H. De Bock, Groningen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Pim A. De Jong, MD, PhD, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Rozemarijn Vliegenthart, MD, PhD, Groningen, Netherlands (*Presenter*) Nothing to Disclose
Matthijs Oudkerk, MD, PhD, Groningen, Netherlands (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare volume and predicted growth rate of benign and malignant new solid nodules in a large randomized low-dose computed tomography (LDCT) lung screening trial.

METHOD AND MATERIALS

This trial was approved by the Ministry of Health. All participants gave informed consent. Following baseline LDCT screening, incidence-screenings took place after 1, 3 and 5.5 years. For this study, participants were selected with solid non-calcified nodules, newly detected after baseline and also in retrospect not present on any previous screen. Nodule volume was generated semi-automatically by Lungcare software (Siemens, Erlangen, Germany). Growth rate at initial detection was estimated by calculating the slowest predicted volume-doubling time (pVDT), according to the formula $pVDT=[\ln(2)*\Delta t]/[\ln(V2/V1)]$, using the study's detection limit of 15mm3 (V1), the volume of the new nodule at initial detection (V2), and the time interval between current and last screen (Δt [days]). Lung cancer diagnosis was based on histology, and benignity was based on either histology or a stable volume for at least two years. Difference in volume and pVDT between benign and malignant nodules was evaluated by Mann-Whitney U testing.

RESULTS

In total, 1,484 new solid nodules in 949 participants were identified of which 77 (5.2%) were malignant. The median volume of benign (44mm3, interquartile-range [IQR] 22-122mm3) and malignant (373mm3, IQR 120-974mm3) new nodules, as well as the median pVDT of benign (288 days, IQR 153-566 days) and malignant (144 days, IQR 116-213 days) new nodules differed significantly ($P<0.001$ for both). The calculated median pVDT of adenocarcinomas (183 days, IQR 138-299 days) and squamous-cell carcinomas (150 days, IQR 117-223 days) was comparable to VDT of fast-growing baseline cancers of the same histological type as previously published (196 days, IQR 135-250 days and 142 days, IQR 91-178 days).

CONCLUSION

Volume and pVDT may be used to differentiate between benign and malignant solid nodules, newly detected at incidence LDCT lung cancer screening.

CLINICAL RELEVANCE/APPLICATION

A new nodule's initial growth rate can be estimated by the predicted volume-doubling time, which is a new measure that may be helpful in differentiating benign from malignant new nodules.

RC201-05 Lung Nodule Characterization

Monday, Nov. 30 9:30AM - 9:50AM Location: S406B

Participants
Thomas E. Hartman, MD, Rochester, MN (*Presenter*) Author, Cambridge University Press

LEARNING OBJECTIVES

1) Compare evidence LDCT screening for lung cancer from the North American and European trials. 2) Classify screen-detected lung nodules and recommend appropriate management. 3) Incorporate the essential elements of a clinical lung cancer screening program. 4) Critique the evidence for and against screening patients who do not meet current eligibility criteria for LDCT screening.

RC201-06 Can Morphological Features Differentiate between Malignant and Benign Pulmonary Nodules, Detected in a Screen Setting?

Monday, Nov. 30 9:50AM - 10:00AM Location: S406B

Participants
Sarah J. Van Riel, MD, Nijmegen, Netherlands (*Presenter*) Research Grant, MeVis Medical Solutions AG
Francesco Ciompi, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Mathilde Winkler Wille, Hellerup, Copenhagen, Denmark (*Abstract Co-Author*) Nothing to Disclose
Ernst T. Scholten, MD, Haarlemmerliede, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Nicola Sverzellati, Parma, Italy (*Abstract Co-Author*) Nothing to Disclose
Santiago E. Rossi, MD, Capital Federal, Argentina (*Abstract Co-Author*) Advisory Board, Koninklijke Philips NV Speaker, Pfizer Inc Royalties, Springer Science+Business Media Deutschland GmbH
Asger Dirksen, Hellerup, Denmark (*Abstract Co-Author*) Nothing to Disclose
Rianne Wittenberg, MD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Monique Brink, MD, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Speaker, Toshiba Corporation
Matiullah Naqibullah, Hellerup, Copenhagen, Denmark (*Abstract Co-Author*) Nothing to Disclose
Mathias Prokop, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Speakers Bureau, Bayer AG Speakers Bureau, Bracco Group Speakers Bureau, Toshiba Corporation Speakers Bureau, Koninklijke Philips NV Research Grant, Toshiba Corporation
Cornelia M. Schaefer-Prokop, MD, Nijmegen, Netherlands (*Abstract Co-Author*) Advisory Board, Riverain Technologies, LLC
Bram Van Ginneken, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Stockholder, Thirona BV Co-founder, Thirona BV Research Grant, MeVis Medical Solutions AG Research Grant, Canon Inc Research Grant, Toshiba Corporation Research Grant, Riverain Technologies, LLC

PURPOSE

Existing nodule classification systems and risk models (e.g., McWilliams model, Lung-RADS) consider only nodule type, size, growth, and the presence of a spiculated border. However, radiologists consider additional morphological features when assigning a malignancy risk. Goal of the study was to determine the power of additional morphological features to differentiate between benign and malignant nodules.

METHOD AND MATERIALS

All 60 cancers were selected from the Danish Lung Cancer Screening Trial, in the first scan where they were visible, and a benign set of 120 randomly selected and 120 size-matched benign nodules from baseline scans were included, all from different participants. Data had been acquired using a low-dose (16x0.75mm, 120 kVp, 40 mAs) protocol, and 1mm section thickness reconstruction. Seven radiologists were asked to score the presence of morphological features for each nodule referring to density distribution (homogeneous, inhomogeneous, high, low), lesion margin (spiculation, lobulation, demarcation by interlobular septa, sharply-defined, ill-defined), lesion surrounding (distortion of the surrounding parenchyma, pleural/fissure retraction, attachment to pleura, fissure or vessel) and lesion architecture (thickened wall of a bulla, bubbles, air bronchogram). Separately per observer and feature, chi square analysis was used to determine the power to discriminate between benign and malignant nodules. Features with a p-value <0.05 in ≥ 4 observers are reported.

RESULTS

Significant differences were seen for inhomogeneous density distribution ($p < 0.001$ - 0.003) and pleural/fissure retraction ($p < 0.001$ - 0.047) in 7 observers. The presence of bubbles ($p < 0.001$ - 0.025), spiculation ($p < 0.001$), lobulation ($p < 0.001$), and an ill-defined nodule border ($p<0.001$-0.012) were significant in 6 observers. The presence of a thickened bulla wall in 5 observers ($p<0.001$-0.042), and air bronchogram ($p<0.001$-0.006) and distortion of surrounding architecture ($p<0.001$-0.004) was significantly different in 4 observers.

CONCLUSION

We have identified several morphological features that are significantly associated with malignancy of pulmonary nodules, but not included in current risk prediction models.

CLINICAL RELEVANCE/APPLICATION

Morphological features can be used to differentiate malignant from benign nodules. Further studies will show whether integration of more morphological features will increase the power of risk prediction.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Santiago E. Rossi, MD - 2015 Honored Educator

RC201-07 Questions and Answer

Monday, Nov. 30 10:00AM - 10:15AM Location: S406B

Participants

RC201-08 Lung Nodule Management

Monday, Nov. 30 10:30AM - 10:50AM Location: S406B

Participants
Jane P. Ko, MD, New York, NY (*Presenter*) Speaker, Siemens AG

LEARNING OBJECTIVES

1) Compare evidence LDCT screening for lung cancer from the North American and European trials. 2) Classify screen-detected lung nodules and recommend appropriate management. 3) Incorporate the essential elements of a clinical lung cancer screening program. 4) Critique the evidence for and against screening patients who do not meet current eligibility criteria for LDCT screening.

RC201-09 Follow-up Recommendation Compliance in a Clinical CT Lung Screening Program

Monday, Nov. 30 10:50AM - 11:00AM Location: S406B

Participants
Sama Alshora, MD, Burlington, MA (*Presenter*) Nothing to Disclose
Brady J. McKee, MD, Burlington, MA (*Abstract Co-Author*) Spouse, Advisory Board, Medtronic, Inc;
Shawn Regis, PhD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Christopher C. Bolus, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Andrea B. McKee, MD, Burlington, MA (*Abstract Co-Author*) Advisory Board, Medtronic, Inc; Speaker, Medtronic, Inc; ;
Robert J. French JR, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Sebastian Flacke, MD, Burlington, MA (*Abstract Co-Author*) Consultant, BTG International Ltd; Consultant, Surefire Medical, Inc; Consultant, Koninklijke Philips BV; Consultant, XACT Robotics

PURPOSE

To assess patient compliance with follow-up recommendations in a clinical CT lung screening program.

METHOD AND MATERIALS

We retrospectively assessed the rate of patient compliance with exam follow-up recommendations in our CT lung screening program. All patients evaluated fulfilled the NCCN high-risk criteria for lung cancer screening and underwent screening between 1/12/2012 and 6/12/2013. Screened patients referred from outside our institution were excluded due to limited follow-up. Patients with negative, benign, or probably benign results were recommended to have a repeat screening exam in 6-12 months. Patients with suspicious findings were recommended to undergo a pulmonary consultation. To be considered compliant, patients had to be no more than 90 days past due for their next recommended exam or clinical evaluation as of 9/12/2014. Patients who died, were diagnosed with cancer, exceeded the program age limit, or became otherwise ineligible for additional screening were considered adherent. Compliance rates were assessed across multiple factors including sex, age, smoking history, baseline exam result, and NCCN high-risk group status.

RESULTS

901 high-risk patients from our institution underwent a baseline CT lung screening exam between 1/12/2012 and 6/12/2013. 772/901 (85.7%) were compliant as of 9/12/2014. 155/901 (17.2%) were non-compliant during the study interval of which 26 (16.8%) returned to screening compliance by 9/12/2014. The most common reasons for non-compliance were refusal to undergo the follow-up exam (66.7%), inability to contact the patient (20.9%), and patient inability to obtain a followup order from their physician (7.8%). 23/901 (2.6%) were discharged for reasons other than non-compliance. Subgroup analysis demonstrated a statistically significant increase in screening compliance among female patients ($p = 0.035$) and among those patients 65-73 years old ($p=0.040$).

CONCLUSION

High rates of compliance with CT lung screening recommendations are achievable in clinical practice.

CLINICAL RELEVANCE/APPLICATION

Monitoring patient compliance with exam follow-up recommendations and reviewing reasons for non-compliance are important quality initiatives in a clinical CT lung screening program.

RC201-10 Building a Clinical Program

Monday, Nov. 30 11:00AM - 11:20AM Location: S406B

Participants
Jared D. Christensen, MD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Compare evidence LDCT screening for lung cancer from the North American and European trials. 2) Classify screen-detected lung nodules and recommend appropriate management. 3) Incorporate the essential elements of a clinical lung cancer screening program. 4) Critique the evidence for and against screening patients who do not meet current eligibility criteria for LDCT screening.

RC201-11 Trends in CT Screening for Lung Cancer at Leading Academic Medical Centers from 2013 to 2015

Monday, Nov. 30 11:20AM - 11:30AM Location: S406B

Participants
Phillip M. Boiselle, MD, Boston, MA (*Presenter*) Nothing to Disclose
Caroline Chiles, MD, Winston-Salem, NC (*Abstract Co-Author*) Nothing to Disclose
James G. Ravenel, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Charles S. White, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine trends in CT lung cancer screening at leading academic medical centers (AMCs).

METHOD AND MATERIALS

A survey was emailed in March 2015 to thoracic radiologists at 21 leading AMCs, identified from the US News and World Report listings of top hospitals, cancer centers, and pulmonary medicine centers. Radiologists who currently offer lung cancer screening were asked additional questions ranging from patient selection policies to implementation of Lung-RADS in their practice. 2015 survey results were compared to March 2013 and March 2014 survey results for select questions that overlapped between the 3 surveys.

RESULTS

Of the 18 survey respondents (86% response rate), 17 (94%) have an active CT screening program, similar to 2014. Concerning

patient volumes, 14 of 17 (82%) sites reported that the number screened was stable to increased over the past 3 to 6 months, and substantially fewer sites scan ≤5 patients per week compared to prior years (29% in 2015; 74% in 2014; and 87% in 2013). Regarding charges, a self-pay model was used exclusively at only 1 of 17 sites (6%) in 2015, a decrease from 47% in 2014. NLST entry criteria remained the most common patient selection criteria in 2015, but 4 sites (24%) have adopted the new CMS guidelines and 5 sites (29%) are now using expanded NCCN criteria. Concerning solid nodule size thresholds for defining a positive screen, 12 of 17 sites (71%) now use ≥6 mm, an increase from 11% in 2014. With regard to accreditation, 8 of 17 sites (47%) are designated as an ACR screening site and almost all other sites are planning to apply for this designation. A majority of sites (13 of 17, 76%) have incorporated Lung-RADS, whereas the remaining sites use other guidelines such as NCCN. Nearly half of all sites (8 of 17, 47%) have introduced local training and/or credentialing policies for participating radiologists. Only 1 site uses software for volumetric nodule measurement and computer aided detection, whereas 5 of 17 (29%) sites use data management software for tracking patient data.

CONCLUSION

Screening practices are rapidly evolving at leading AMCs, with greater conformity to nodule size criteria and management guidelines following the release of updated screening guidelines and Lung-RADS.

CLINICAL RELEVANCE/APPLICATION

Over the last 2 years, leading AMCs have experienced greater patient volumes, increased payor mix, revised solid nodule size threshold from 4 mm to ≥6 mm, and incorporation of Lung-RADS.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Phillip M. Boiselle, MD - 2012 Honored Educator

RC201-12 Screening: Out of the Box

Monday, Nov. 30 11:30AM - 11:50AM Location: S406B

Participants
Brady J. McKee, MD, Burlington, MA (*Presenter*) Spouse, Advisory Board, Medtronic, Inc;

LEARNING OBJECTIVES

1) Compare evidence LDCT screening for lung cancer from the North American and European trials. 2) Classify screen-detected lung nodules and recommend appropriate management. 3) Incorporate the essential elements of a clinical lung cancer screening program. 4) Critique the evidence for and against screening patients who do not meet current eligibility criteria for LDCT screening.

RC201-13 Panel Discussion

Monday, Nov. 30 11:50AM - 12:00PM Location: S406B

Participants

RC202

Strategies for ABR Certifying Exam Preparation and ACGME Program Requirements

Monday, Nov. 30 8:30AM - 10:00AM Location: S102D

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Lori A. Deitte, MD, Nashville, TN, (Lori.deitte@vanderbilt.edu) (*Moderator*) Nothing to Disclose

Sub-Events

RC202A The ABR Certifying Exam: Are You Ready?

Participants
Dennis M. Balfe, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the components of the ABR Certifying examination. 2) List a variety of item types that will appear on the examination. 3) Discuss the preliminary results of the most recent administration.

RC202B Fresh from the First ABR Certifying Exam: Perspectives on the Exam Experience while Starting an Academic Job

Participants
Jordan S. Gross, MD, Nashville, TN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe resources to help prepare for the new ABR certifying exam. 2) Discuss perspectives on how to balance ABR certifying exam preparation with starting a job in academic medicine.

ABSTRACT

The American Board of Radiology offered the Certifying Exam for the first time in October of this year. Unlike the oral board system where the examination was offered during the fourth year of residency, this year's candidates completed the Core Exam in 2013 and have now been in fellowship and/or practicing radiology for the past two years. Graduates of radiology residency are now board eligible and have the challenge of preparing for this exam while also being in a new work environment. Perspectives on preparing for the exam during fellowship and while practicing in an academic center will be discussed.

RC202C Fresh from the First ABR Certifying Exam: Perspectives on the Exam Experience while Starting a Private Practice Job

Participants
Sonya Bhole, MD, Park Ridge, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe resources to help prepare for the new ABR certifying exam. 2) Discuss perspectives on how to balance ABR certifying exam preparation with starting a private practice job.

ABSTRACT

Since the 2007 American Board of Radiology (ABR) announcement of a change in the ABR examination format, timing and content, radiology educators have been analyzing these changes and their potential impact on interviewing for and starting an academic or private practice job. The first cohort of radiologists eligible for the new ABR certifying examination will have completed this exam approximately two months prior to the RSNA meeting. Perspectives on preparing for the exam while starting a private practice job will be discussed. Ideas on how future board eligible radiologists might approach the ABR certifying exam preparation process will be highlighted during the presentation.

RC202D Noninterpretive Skills: Not Unimportant Skills

Participants
Mark E. Mullins, MD, PhD, Atlanta, GA, (memulli@emory.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define noninterpretive skills within the context of a Diagnostic Radiology Residency, Radiology-related fellowship and practice following training. 2) Appraise challenges and opportunities related to noninterpretive skills. 3) Develop a personal strategic plan for assessment and improvement related to noninterpretive skills.

ABSTRACT

Interest in noninterpretive skills may be related to changes in ACGME requirements, ABR examinations, and other institutional/regulatory mandates. Ultimately, the most convincing reason to prioritize these skills is the importance that they play in our everyday life as Radiologists and Radiologists-in-training. In this session, we will review noninterpretive skills and share practical

tips on how to teach and assess these essential skills.

RC203

Imaging Nonischemic and Ischemic Disease of the Myocardium

Monday, Nov. 30 8:30AM - 10:00AM Location: S504AB

CA CT MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

LEARNING OBJECTIVES

ABSTRACT

Sub-Events

RC203A MRI and CT of Cardiac Masses

Participants
Phillip M. Young, MD, Rochester, MN, (young.phillip@mayo.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review role of MR and CT in assessing cardiac masses. 2) To highlight the potential for detection, characterization, staging, and guiding surgical decision making with cardiac MR and CT through clinical cases. 3) To review some practical tips and tricks to keep in mind when imaging these challenging cases.

ABSTRACT

RC203B Infiltrative Diseases (Amyloid, Hemochromatosis Fabrys, Sarcoid)

Participants
Kristopher W. Cummings, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the role of cardiac MR in the evaluation of infiltrative cardiomyopathy. 2) Describe typical patterns and locations of MR late gadolinium enhancement associated with various types of infiltrative disease. 3) Explain the role of noncontrast MR in the evaluation for myocardial iron deposition.

ABSTRACT

RC203C Non Infiltrative Non-ischemic Cardiomyopathies (HCM, Noncompaction, ARVD, Myocarditis, Takatzubo etc.)

Participants
Karen G. Ordovas, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand how to differentiate ischemic from non-ischemic cardiomyopathies on cardiac MRI. 2) To recognize the cardiac MR findings suggestive of the diagnosis of different types of non-ischemic cardiomyopathies. 3) To identify cardiac MR findings that have a prognostic role in patients with non-ischemic cardiomyopathies

ABSTRACT

RC203D T1-mapping, T2 Mapping and Quantitative Imaging

Participants
Arthur E. Stillman, MD, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the role of T1, T2 and ECV mapping for aiding cardiac disease diagnosis. 2) To review the potential of T1 and T2 mapping for monitoring therapy.

ABSTRACT

Recent advances permit quantitative MRI imaging using T1- and T2- maps. These provide a new method for tissue characterization and can be used to aid diagnosis and for monitoring treatment. Examples relating to cardiac imaging in include acute myocardial infarction, myocarditis, amyloid and Fabry disease. Recent literature suggests that quantitative T1-and T2- maps improve diagnostic capabilities compared with T1- and T2 weighted MRI. When used following the administration of gadolinium contrast, T1-maps can be used to calculate the extracelluar volume maps of myocardium. This literature will be reviewed and illustrated with case examples.

RC204

Musculoskeletal Series: Knee and Hip MR Imaging

Monday, Nov. 30 8:30AM - 12:00PM Location: E451B

MK MR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

Participants
Lynne S. Steinbach, MD, San Francisco, CA, (lynne.steinbach@ucsf.edu) (*Moderator*) Nothing to Disclose
Miriam A. Bredella, MD, Boston, MA, (mbredella@mgh.harvard.edu) (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

ABSTRACT

Sub-Events

RC204-01 Pitfalls in Knee MRI Interpretation

Monday, Nov. 30 8:30AM - 8:55AM Location: E451B

Participants
Lynne S. Steinbach, MD, San Francisco, CA, (lynne.steinbach@ucsf.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize common causes of false positives on MRI of the knee including misinterpretation of normal structures and normal variants, such as the dorsal defect of the patella. 2) Review causes of false negatives on MRI of the knee that may be undetected due to lack of recognition or that may look normal over time, such as a chronic cruciate ligament tear.

ABSTRACT

MRI if highly accurate for evaluation of the knee joint. This lecture will emphasize common pitfalls and pearls to get around them when evaluating the knee with MRI. Some anatomic structures and normal variants can simulate an abnormality of the menisci, ligaments, cartilage, bone and surrounding soft tissues of the knee on MRI. In addition there are some abnormalities that can be missed or misinterpreted.

RC204-02 The Anterolateral Ligament of the Knee: A Regular Ligament or Our Imagination? Correlation of MR Imaging with Anatomical Findings

Monday, Nov. 30 8:55AM - 9:05AM Location: E451B

Participants
Enver G. Tahir, MD, Hamburg, Germany (*Presenter*) Nothing to Disclose
Christoph A. Berliner, MD, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Sinef Yarar, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Georg Luers, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Murat Karul, MD, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Jin Yamamura, MD, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Recently, evidence has been accumulating for the existence of a previously unknown structure at the anterolateral aspect of the human knee named anterolateral ligament (ALL). The aim of this study was to evaluate the visibility and to describe the anatomical features of the ALL using magnetic resonance imaging (MRI) and to correlate the results with gross anatomical findings.

METHOD AND MATERIALS

16 human knees were obtained from cadavers (4 male, 9 female) at a mean age of 84.3 ±5.2 years. All specimens were examined with plain film radiography to exclude advanced degenerative arthrosis, prior osseous injuries as well as joint replacement. Subsequently, MRI scans were performed with a 3 Tesla machine (Ingenia, Philips). Two musculoskeletal radiologists independently reviewed coronal and axial T1- and proton density-weighted images to assess the visibility of the ALL. In all 16 knees the lateral supporting structures were carefully dissected by an orthopedic surgeon and an anatomist to identify the course and anatomy of the ALL as well as its length and thickness.

RESULTS

On the basis of MR imaging a consistent structure correspondent to the ALL was identified in 11 knees (68%). On anatomical dissection the ALL was found in 13 knees (81%). It originated at the lateral femoral epicondyle and its proximal part was blended with the lateral collateral ligament (LCL) making it difficult to distinguish these two structures. The ALL was distally separate from the LCL and ran obliquely to insert on the lateral tibial plateau between Gerdy's tubercle and the fibular head. Measurements of a completely visible ALL on anatomic dissections revealed an average proximal length of 42.8 ±4.6 mm and a distal length of 34.3 ±10.8 mm, whereas its width was 6.46 ±2 mm.

CONCLUSION

MRI of the knee was accurate and sensitive in the identification of the intact ALL. It appeared as a thin black structure on T1 weighted sequences and was best visualized on coronal images. Information concerning this structure may be crucial with respect to the diagnosis and understanding of knee pathologies.

CLINICAL RELEVANCE/APPLICATION

The ALL is believed to be responsible for the Segond fracture and its rupture has been associated with anterolateral rotational knee instability. MRI imaging may provide valuable information about the ALL.

RC204-03 Anterolateral Ligament Injury in Patient with Acute ACL Tears on MRI: Prevalence, Patterns and Relationships with Tibial Contusions

Monday, Nov. 30 9:05AM - 9:15AM Location: E451B

Participants
Angel J. Lopez-Garib, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Nogah Shabshin, MD, MBA, Haifa, Israel (*Abstract Co-Author*) Consultant, Active Implants Corporation

PURPOSE

The anterolateral ligament (ALL) of the knee is believed to be involved in maintaining rotatory stability of the knee, may be injured with the anterior cruciate ligament (ACL) tear during pivot shift injuries and may be accountable for failed ACL repairs. We sought to describe the incidence and patterns of ALL injury in patients with acute ACL tears, and investigate if there is a relationship with various bone contusions, meniscal tears and posterolateral injuries.

METHOD AND MATERIALS

Knee MR examinations of 81 patients with acute ACL tears were retrospectively reviewed by two musculoskeletal radiologists to assess the ALL: visualization, location of tibial insertion, sprain and presence of an anterolateral tibia insertional bone contusion. Additional bone contusions in the posteromedial, posterolateral and anteromedial tibia and lateral femoral condyle were noted, as well as meniscal tears and posterolateral injuries (popliteus tendon and fibular collateral ligament [FCL]). Statistical analysis for relationships of these findings with ALL injuries was obtained utilizing the Pearson correlation and Chi2 tests.

RESULTS

ALL injury, including sprain and/or an anterolateral tibia traction contusion, was seen in 49/81 (60%) (34/81 [42%] and 32/81 [40%], respectively), with an avulsion fracture in 3/32 (9%). Anteromedial and posterolateral tibial contusions were significantly more common in patients with ALL injury (p=0.004 and p=0.006, respectively). The anterolateral tibial traction contusion was characteristically subcortical, elongated (mean size (mm) 10.7CC x 12.7AP x 4.6TV), and involved the middle anteroposterior third of the tibia. There was correlation with posterolateral injury (p=0.046) and medial meniscal tears (32/81, p=0.049). There was no relationship between lateral meniscus tear, posterolateral tibial or lateral femur bone contusion and ALL injury.

CONCLUSION

ALL injury is present in more than 50% of ACL tears. It is specifically associated with anteromedial and posterolateral tibial contusions, and some demonstrate a characteristic anterolateral traction contusion.

CLINICAL RELEVANCE/APPLICATION

ALL injury is common on MRIs of acute ACL tears. Anteromedial and posterolateral tibia contusions are suspicious and anterolateral, elongated subcortical tibia contusion and ALL sprain should be assessed.

RC204-04 Distal MCL Tears of the Knee: MRI Features of Stener-like Lesions

Monday, Nov. 30 9:15AM - 9:25AM Location: E451B

Participants
Robert D. Boutin, MD, Sacramento, CA (*Presenter*) Nothing to Disclose
Russell C. Fritz, MD, Mill Valley, CA (*Abstract Co-Author*) Nothing to Disclose
Richard E. Walker, MD, Calgary, AB (*Abstract Co-Author*) Nothing to Disclose
Mini N. Pathria, MD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Cassandra A. Lee, MD, Sacramento, CA (*Abstract Co-Author*) Nothing to Disclose
Lawrence Yao, MD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To analyze the MRI characteristics of distal MCL tears, without and with displacement superficial to the pes anserinus (Stener-like lesion [SLL]).

METHOD AND MATERIALS

In this IRB-approved study, MRI examinations of the knee at three institutions were selected which showed partial or complete tears of the (superficial) MCL centered distal to the joint line. MRI examinations were evaluated independently by two musculoskeletal radiologists for: a SLL of the distal MCL; coexistent tears of the meniscotibial and meniscofemoral ligaments; a wavy contour to the more proximal MCL; the vertical distance of the stump from the medial joint line; and the transverse distance of the stump from the medial tibial cortex. Additional co-existent knee injuries also were recorded.

RESULTS

The study included 32 patients (median age: 27 years; interquartile range 18 years). A SLL of the MCL was identified in 11 of 32 cases. The proximal stump margin was located significantly (p<.01, Mann Whitney U) more distal in cases with a SLL (mean=35 mm, sd=11 mm), as compared to without a SLL (mean=16 mm, sd=15 mm). The incidence of ACL tear, PCL tear, meniscotibial/meniscofemoral ligament tear, and lateral compartment osseous injury was high in cases with a SLL (91%, 36%,73%, and 91%, respectively), but not significantly different (p>0.10, Fisher's exact test) from cases without a SLL (81%, 33%, 57%, and 91%, respectively). The MCL had a wavy appearance in 82% of cases with a SLL, and in 62% without a SLL.

CONCLUSION

A SLL of the MCL should be considered in the setting of a high-grade, distal MCL tear, particularly when there is a wavy appearance to the MCL. These lesions are accompanied very frequently by tears of the ACL and meniscotibial/meniscofemoral ligaments.

CLINICAL RELEVANCE/APPLICATION

A SLL of the distal MCL is important to recognize for appropriate treatment and operative decision making.

RC204-05 Postero-lateral Instability (PLI) of the Knee: Can the Right Diagnosis of Postern-lateral Corner (PLC) Structures Involvement, Using the WB-MRI, Evades a Future Anterior Cruciate Ligament (ACL) Reconstruction Failure?

Monday, Nov. 30 9:25AM - 9:35AM Location: E451B

Participants
Silvia Mariani, MD, L'Aquila, Italy (*Presenter*) Nothing to Disclose
Alice La Marra, MD, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose
Francesco Arrigoni, Coppito, Italy (*Abstract Co-Author*) Nothing to Disclose
Antonio Barile, MD, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose
Carlo Masciocchi, MD, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The aim of our study was to evaluate the value of weight-bearing (WB)-MRI compared to standard-MRI in unmasking PLC structures involvement to determinate a PLI

METHOD AND MATERIALS

We prospectively analyzed 200 patients positive for an acute ACL injury, only 100 of them with suspicion of a PLI. All patients underwent a dedicated MRI in supine and WB position with knee flexion of 12°-15°. We evaluated knees for 3 direct signs of ACL injury (discontinuity, ACL alterated morphology and deflection) and for 4 indirect signs (bone bruise, anterior tibial traslation, uncovered lateral meniscus and hyperbuckled posterior cruciate ligament (PCL). We evaluated the involvment of PLC capsuloligamentous structures. All patients underwent arthroscopy.

RESULTS

Among the direct signs we obtained that ACL deflection resulted the most statistical significant ($p<0.004$) ; among the indirect signs the anterior tibial traslation was the most statistical significant ($p<0.0001$) followed by the uncovered lateral meniscus ($p<0.005$). Finally we evaluated the involvement of PCL capsulo-ligamentous structures (antero-lateral and postero-medial popliteo-meniscal ligaments) : both the ligaments were involved in 65/89 of the cases insteas only the inferior one was involved in 24/89 of the cases. Arthroscopy confirmed ACL tear with diagnosis of PLI in 89% of cases. The 100 patients with no clinical suspicion of PLI didin't show modifications of signs during the standard and WB-MRI.

CONCLUSION

The study discovers the value of WB-MRI in recognising the most sensitive direct and indirect signs of ACL injury and to diagnose a PLC involvement, leading patients to the right surgical treatment

CLINICAL RELEVANCE/APPLICATION

The diagnosis of the PLI is always clinical however there is no a pre-operative specific test to diagnose it. The added value of the weight-bearing MRI is to provide further information in unmasking direct/indirect signs of ACL injury negative at standard-MRIThis may be very helpful for the orthopedic surgeon in the choice of possible treatment and to avoid an ACL graft failure

RC204-06 Posterolateral Corner Injuries

Monday, Nov. 30 9:35AM - 10:00AM Location: E451B

Participants
William B. Morrison, MD, Philadelphia, PA (*Presenter*) Consultant, General Electric Company Consultant, AprioMed AB Patent agreement, AprioMed AB Consultant, Zimmer Holdings, Inc

LEARNING OBJECTIVES

1) Understand the anatomy of the posterolateral corner of the knee. 2) Realize the importance of the posterolateral corner in injury of the knee. 3) Be able to recognize major and minor posterolateral corner injury on MRI.

RC204-07 Postoperative Meniscus

Monday, Nov. 30 10:10AM - 10:30AM Location: E451B

Participants
Robert D. Boutin, MD, Sacramento, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Differentiate between the 3 surgical techniques applied to the torn meniscus (the "three R's": Resection, Repair, and Replacement) -- each resulting in a different 'normal' MRI appearance of the postoperative meniscus. 2) Detect recurrent/residual tears in the post-operative meniscus on MRI.

ABSTRACT

After highlighting relevant anatomy, we review the current indications and techniques used for meniscus surgery, and focus on MRI interpretation of the postoperative meniscus, including recurrent tears and outcomes/complications.

RC204-08 Pitfalls in Hip MRI Interpretation

Monday, Nov. 30 10:30AM - 10:55AM Location: E451B

Participants
Donna G. Blankenbaker, MD, Madison, WI, (dblankenbaker@uwhealth.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Develop a search pattern in the evaluation of the painful hip. 2) Identify common pitfalls in hip MRI interpretation. 3) Describe different features for conditions affecting the hip. 4) Differentiate between normal variants and pathology of the hip.

ABSTRACT

Relevant hip anatomy will be reviewed, followed by imaging features of intra-articular, internal and osseous pathology in the patient with the painful hip. Interpretive imaging pitfalls of these structures will be discussed.

RC204-09 Can MRI Predict a Future Bucket Handle Type Meniscus Tear in Patients with Recent Knee Trauma and ACL Injury?

Monday, Nov. 30 10:55AM - 11:05AM Location: E451B

Participants
Roula Bou Sader, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Michael G. Kendrick, MD, Denver, CO (*Abstract Co-Author*) Nothing to Disclose
William B. Morrison, MD, Philadelphia, PA (*Abstract Co-Author*) Consultant, General Electric Company Consultant, AprioMed AB Patent agreement, AprioMed AB Consultant, Zimmer Holdings, Inc
Adeel H. Azam, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Johannes B. Roedl, MD, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Michael G. Ciccotti, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Adam C. Zoga, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

We anecdotally observed patients suffer bucket handle type meniscus tears (BHMT) after ACL reconstruction, requiring a 2nd surgery. We sought to assess if a knee MRI performed post initial injury can predict a potential future BHMT using a novel assessment algorithm for traumatic meniscal injury.

METHOD AND MATERIALS

A PACS and report database was searched for MRI knee examinations describing a medial BHMT from 2006 to 2013. These exams were then screened for the availability of a prior MRI performed after a trauma with no BHMT. The prior MRI was reviewed for presence of a meniscal tear or lesion borderline for a tear, tear configuration (oblique, horizontal, vertical, or complex), tear location (anterior horn, body, and/or posterior horn), tear zone (red, white, and/or pink), tear extension to articular surfaces of the meniscus (inferior, superior or both) and the presence of concomitant anterior cruciate ligament pathology (disruption or reconstruction). The time interval between the initial MRI and the BHMT MRI was recorded, as was patient age and gender.

RESULTS

931 MRIs with reported BHMT yielded 39 subjects with prior MRI. Of these, only 7/39 (17.9%) had no clear meniscus tear on the initial study and 6/7 had edema type signal at the posteromedial margin of the medial meniscus. Of the 32/39 (82.1%) with prior meniscal tears: 27/32 (84.4%) were vertical or complex with a vertical component, 4/32 (12.5%) were oblique, and 1/32 (3.1%) were horizontal. All of the prior meniscal tears involved the posterior horn while 10/32 (31.2%) also involved the meniscal body. The red zone was most often involved (28/32, 87.5%), while the white and pink zones were involved in 12/32 (37.5%) and 15/32 (46.8%) respectively. Concomitant ACL pathology was common on the initial exams, seen in 26/39 (66.6%). Of the 26 patients with ACL pathology, 16 had an active ACL tear and 10 had a prior ACL reconstruction. 28/32 (87.5%) of the initial meniscus tears including all vertical tears involved both articular surfaces.

CONCLUSION

In the setting of knee trauma and ACL injury, MR findings of a vertical medial meniscus tear involving the red zone and both articular meniscal surfaces should raise concern for the potential evolution of a BHMT.

CLINICAL RELEVANCE/APPLICATION

A non displaced peripheral vertical medial meniscal tear is an important observation on a posttraumatic knee MRI. Orthopedists should consider repair to prevent the evolution of a BHMT.

RC204-10 Hip MR Arthrography: Are We Underdiagnosing Laxity Pre-operatively?

Monday, Nov. 30 11:05AM - 11:15AM Location: E451B

Participants
Geoffrey M. Riley, MD, Half Moon Bay, CA (*Presenter*) Nothing to Disclose
Michael L. Richardson, MD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Jonathan Packer, MD, Redwood City, CA (*Abstract Co-Author*) Nothing to Disclose
Marc Safran, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Robert D. Boutin, MD, Sacramento, CA (*Abstract Co-Author*) Nothing to Disclose
Michelle Nguyen, MD, La Jolla, CA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The preoperative clinical exam is known to be unreliable for the diagnosis of hip laxity and often an exam under anesthesia is necessary for diagnosis. The purpose of this study is to ascertain if MR arthrography findings are associated with laxity.

METHOD AND MATERIALS

After obtaining IRB approval, we identified 57 consecutive patients (36 women, 21 men) undergoing first hip MR arthrography and then arthroscopy by a single hip arthroscopist, within a maximum of 10 months (excluding patients with hip hardware, fractures, or tumors). The original MR report was reviewed for the preoperative diagnosis of laxity. An MSK radiologist and an MSK fellow blinded to surgical results then re-reviewed, by consensus, the MR arthrograms for 2 morphologic findings that have been associated with hip laxity: Widening of the anterior hip joint recess (>5 mm) and thinning of the adjacent joint capsule (< 3mm). Measurements were made on an axial T1-weighted image without fat saturation at the level of the anterior capsule insertion onto the greater

trochanter. An orthopaedic surgeon (blinded to MR findings) reviewed the arthroscopy reports for the documentation of clinical laxity determined by examination under anesthesia (reference standard).

RESULTS

None of the 57 MR reports described the findings related to laxity. Logistic regression was performed using clinical laxity as the dependent variable and gender, age, and MR findings of laxity scored as independent variables. Clinical laxity was much more common in women (26 women, one man). It was also more common in older patients. Statistically significant associations were noted between clinical laxity and gender (odds ratio for men = 0.009, p = 0.0001) and the presence of both MR findings of laxity (odds ratio = 11.1, p = 0.039).

CONCLUSION

Hip laxity is commonly underdiagnosed on pre-operative MR reports, compared with exam under anesthesia. We were able to confirm an association between clinical laxity and the MR findings of anterior recess widening and anterior capsular thinning.

CLINICAL RELEVANCE/APPLICATION

Atraumatic hip instability is increasingly recognized as a cause of hip pain that is potentially treatable, but difficult to diagnose preoperatively. MR may help identify patients with laxity, thus influencing surgical management.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Michael L. Richardson, MD - 2013 Honored Educator
Michael L. Richardson, MD - 2015 Honored Educator

RC204-11 Supine Versus Standing Radiographs for Ischiofemoral Impingement Using a Propensity Score-Match

Monday, Nov. 30 11:15AM - 11:25AM Location: E451B

Participants
Kyu-Sung Kwack, MD, PhD, Suwon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sung Hoon Park, MD, Suwon-Si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seulgi You, MD, Suwon, Korea, Republic Of (*Presenter*) Nothing to Disclose
Yoolim Baek, MD, Suwon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The aims of this study were to test useful parameters for ischiofemoral impingement (IFI) on both supine and standing anteroposterior hip radiographs, and to suggest optimal cut-off points for detection of IFI on radiograph.

METHOD AND MATERIALS

We performed a retrospective study for all patients who had a clinical history of hip pain. All hip joints with quadratus femoris muscle (QFM) edema characterized by increased signal intensity on axial FatSat T2-weighted MR images were selected as a IFI patient group, and an age- and sex-matched control group was created from the same cohort by propensity-score matching. Two readers independently measured the parameters, including ischiofemoral space (IFS), quadratus femoris space (QFS) and hamstring tendon area (HTA) on MR images. The ischiofemoral distance (IFD) and femur neck shaft angle (NSA) were also measured on radiographs. Differences in each parameters between the two study groups were assessed by using the Mann-Whitney U test. Interobserver agreement was quantified by using the intraclass correlation coefficient. The area under the ROC curve (AUC) was calculated as a measure of discriminative ability. Youden's J statistic was used to select the optimum cut-off points for each parameters on radiograph.

RESULTS

A total of 30 patients with QFM edema (44 hip joints, age: 54.8±11 years) were included in the IFI patient group. A total of 88 patients without QFM edema (88 hip joints, age: 51.8 ± 13.4) were selected as control group from a cohort after propensity score matching. IFS, QFS, NSA and IFD showed statistically significant differences between two groups ($p < 0.05$). IFS, QFS and IFD showed almost perfect interobserver agreements ($r > 0.8$). IFDs showed good discrimination abilities (AUC > 0.80). Optimal cut-off points for IFD by reader 1 were 19.9 mm and 16.2 mm on supine radiograph and standing radiograph, respectively. Optimal cut-off points for IFD by reader 2 were 21.1 mm and 17.0 mm, respectively.

CONCLUSION

IFDs on both supine and standing hip radiographs showed good diagnostic performances for detection of IFI. It could be used as a good screening tool with optimal cut-off points.

CLINICAL RELEVANCE/APPLICATION

The measurements of ischiofemoral distances on both supine and standing hip radiographs are useful screening tool with good diagnostic performances for detection of ischiofemoral impingement.

RC204-12 Validation of 3D MRI for the Measurement of Skeletal Muscle Volumes

Monday, Nov. 30 11:25AM - 11:35AM Location: E451B

Participants
Elizabeth Robinson, London, United Kingdom (*Presenter*) Nothing to Disclose
Johann Henckel, MD, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Marc Modat, PhD, Hertforshire, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Christian Klemt, MSc, Hertforshire, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

Jorge Cardoso, PhD, Hertforshire, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Keshthra Satchithananda, MBBS, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Sebastien Ourselin, PhD, Hertforshire, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Alister Hart, MBBS, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To validate the use of 3D MRI in volumetric computation of muscle wasting To demonstrate the role for 3D MRI in evaluating diseased muscles around hip replacements

METHOD AND MATERIALS

We have applied a novel automated segmentation propagation framework to the MR images of 18 patients with unilateral metal on metal hip replacements. The MR images were manually segmented into the following muscles: Gluteus maximus, Gluteus minimus, Iliopsoas and Tensor Fasciae Latae. MR images were bias-field corrected. The scans were divided in half to create two databases, healthy and diseased, which were processed separately. Each MR image in the database was affinely registered to all the other images using a block matching algorithm and aligned to a common space. We obtained an average matrix for the alignment of images in the database using least trimmed square regression. Consensus segmentation was achieved using similarity and truth estimation algorithm for propagated segmentations (STEPS). The proposed framework was assessed using a leave-one out validation approach. This was used to quantify a clinically relevant imaging biomarker.

RESULTS

The MR images of 18 patients (11 female, 7male) aged 64 ± 15yrs underwent novel automated segment propagation. The leave-one out cross validation framework assessing the influence of non-rigid registration and label fusion parameters gave the average Dice score for healthy hip muscles is 0.864 (range 0.804-0.931). The average Dice score for pathological hip muscles is 0.827 (range 0.753-0.899).

CONCLUSION

The accuracy of the proposed automated framework was verified by leave one out cross validation. The values obtained for the average are promising given that only 17 MR images are in the database. We would expect these scores would to rise with a larger database of images. Future work would involve the expansion of this database in order to define more variability and obtain more accurate automated segmentation.

CLINICAL RELEVANCE/APPLICATION

3D MRI, a technique applied successfully in brain imaging, offers a novel way to monitor the muscle disease formation and progression in patients with hip arthroplasties. This automated segmentation framework can be used to verify volume discrepancies in unilateral hip arthroplasty patients which is currently done manually. This technique will aid patient monitoring and surgical planning.

RC204-13 Extraarticular Hip MRI

Monday, Nov. 30 11:35AM - 12:00PM Location: E451B

Participants
Miriam A. Bredella, MD, Boston, MA, (mbredella@mgh.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with normal anatomy and common pathology of muscles, tendons, and bursae around the hip. 2) Demonstrate understanding of the pathomechanisms and imaging findings of extra-articular hip impingement syndromes.

ABSTRACT

Relevant extra-articular hip anatomy will be reviewed, followed by MRI findings of common pathology of tendons, muscles, and bursae around the hip. Pathomechanisms and imaging findings of extra-articular hip impingement syndromes will be discussed.

RC205

Neuroradiology Series: Spine

Monday, Nov. 30 8:30AM - 12:00PM Location: N228

NR CT MR

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
Michael N. Brant-Zawadzki, MD, Newport Beach, CA (*Moderator*) Nothing to Disclose
Gordon K. Sze, MD, New Haven, CT (*Moderator*) Investigator, Remedy Pharmaceuticals, Inc

Sub-Events

RC205-01 Rational Imaging of the Patient with Spine Pain

Monday, Nov. 30 8:30AM - 9:00AM Location: N228

Participants
Timothy P. Maus, MD, Rochester, MN (*Presenter*) Institutional research contract, Sorrento Therapeutics, Inc

LEARNING OBJECTIVES

1) The learner will be able to identify the major specificity fault of spine imaging . 2) The learner will be able to describe the major sensitivity fault of spine imaging. 3) The learner will be able to describe the utility of spine imaging in the acute presentation of back or limb pain. 4) The learner will be able to describe appropriate utilization of spine imaging in the back / limb pain patient based on guidelines published by major specialty societies.

ABSTRACT

AbstractSpine imaging rightfully has a pivotal role in the evaluation of the patient with back or limb pain, primarily in the exclusion of systemic disease as a cause of symptoms. Unfortunately, imaging is frequently over utilized, providing no measurable benefit to the patient while incurring significant societal cost and potential patient harm. It is imperative to examine the literature to understand the appropriate interpretation, value to the patient, and evidence-based utilization of spine imaging. Systemic disease underlies only 5% of back or limb pain presentations; most imaging findings are categorized as "degenerative." This constitutes the primary specificity fault of spine imaging: the vast majority of reported "degenerative" changes involving the spinal articulations, the disc and facet joints, are asymptomatic and reflect only expected age-related change. They are not a degenerative disease; labeling them as such is misleading. Spine imaging also suffers a sensitivity fault: most advanced imaging is done in a recumbent position, without axial load and physiologic posture. This renders imaging insensitive to dynamic structural alterations present only in the upright patient. Reliance on anatomic structural changes alone must ultimately yield to imaging identification of the local inflammatory processes that are necessary for spine nociception. Utilization of spine imaging must occur as a risk / benefit calculation. The benefits of diagnosis of systemic disease, or guiding therapeutic intervention for truly symptomatic structural/inflammatory changes, must be weighed against the harms of inappropriately labeling the patient as suffering from a degenerative disease, radiation exposure, patient / societal cost, and the precipitation of interventions that are often poorly based on evidence. Evidence-based guidelines for imaging utilization, in combination with an evidence-based understanding of its interpretation, can help physicians employ this powerful tool more effectively and efficiently.

RC205-02 Ossification of the Posterior Longitudinal Ligament: Sex Difference and Prevalence on Computed Tomography (CT)

Monday, Nov. 30 9:00AM - 9:10AM Location: N228

Participants
Kamyar Sartip, MD, Washington, DC (*Presenter*) Nothing to Disclose
Sanmeet Singh, Washington, DC (*Abstract Co-Author*) Nothing to Disclose
Tuo Dong, BS, Washington, DC (*Abstract Co-Author*) Nothing to Disclose
Alexandra M. Millet, BS, Washington, DC (*Abstract Co-Author*) Nothing to Disclose
Motahar Basam, BA, Silver Spring, MD (*Abstract Co-Author*) Nothing to Disclose
Bonnie C. Davis, MD, Washington, DC (*Abstract Co-Author*) Nothing to Disclose
Han Y. Kim, MD, Washington, DC (*Abstract Co-Author*) Nothing to Disclose
Andre J. Duerinckx, MD, PhD, Washington, DC (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

We report the prevalence of ossification of the posterior longitudinal ligament (OPLL) in the cervical spine on computed tomography (CT) in the North American population using the original and newer classification systems proposed by the Japanese Ministry of Public Health and Welfare (JMPHW).

METHOD AND MATERIALS

We retrospectively reviewed CT examinations of the cervical spine in adult patients performed from January 1st, 2009 through March 31st, 2010 at our institution. OPLL type, prevalence, and thickness were recorded. The OPLL types as described in the original JMPHW classification scheme were: continuous, segmental, mixed, and circumscribed. The CT classification comprised of two schemes: A or axial. Classification A described OPLL as bridging or nonbridging. In the axial classification, the location of the OPLL at the level of maximal stenosis on axial imaging was characterized as central or lateral.

RESULTS

We reviewed CT scans on 837 patients, 555 males (66%), with average age of 44.1 years (ranged from 18 to 100 yrs). We

detected 39 OPLL lesions in these 837 patients (4.7%). The OPLL types based on the original classification were 28 segmental, 8 circumscribed, 2 mixed, and 1 continuous. According to classification A, 31 were nonbridge (79%). According to the axial classification, 34 were central (87%). Of the 28 patients with segmental OPLL, 20 (71%) were male. Of the 8 circumscribed OPLL, only 5 (63%) were male. The two patients with mixed type were female.

CONCLUSION

We found the prevalence of OPLL to be 4.7% which is higher than previously reported. Additionally, although prevalence among males was higher than females, we discovered that in the cervical spine that this sex difference is not uniform and depends on type of OPLL.

CLINICAL RELEVANCE/APPLICATION

Ossification of the posterior longitudinal ligament is a well-known cause of spinal stenosis and neurologic dysfunction. The reported prevalence of OPLL based on radiography ranges between 0.1-1.7% in Europe and US, 0.4-3% in Asia excluding Japan, and 1.9-4.3% in Japan. However, we found the prevalence of OPLL to be much higher than previously reported. Given the wide spread use of CT in today's clinical practice, radiologists will identify incidental OPLL in asymptomatic patients. We believe recognition of OPLL and knowledge of its natural history will be important for guiding patient management.

RC205-03 CT Findings Predict Clinical Outcome after Dynamic Posterior Stabilization in Patients with Painful Segmental Instability of the Lower Spine

Monday, Nov. 30 9:10AM - 9:20AM Location: N228

Participants
Benedikt J. Schwaiger, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Alexandra S. Gersing, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Michael Behr, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Claus Zimmer, Muenchen, Germany (*Abstract Co-Author*) Nothing to Disclose
Florian Ringel, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Jan S. Kirschke, MD, Muenchen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Although clinical results after dynamic posterior stabilization in patients with painful degenerative segmental instability of the lower spine are promising, few is known about preoperative CT imaging parameters to select patients who will benefit from this procedure. Purpose therefore was to identify CT findings that predict post-surgical outcome.

METHOD AND MATERIALS

63 patients (age 66±11.7; 38 women) treated with dynamic stabilization for painful segmental instability with/without spinal stenosis were identified. Preoperative MDCT scans were assessed for quantitative and qualitative parameters defining degenerative changes of the thoracolumbar spine. BMD measurements were performed in asynchronously calibrated MDCT. For clinical follow-up at 24 months, visual analogue scale (VAS), Oswestry Disability Index (ODI), Short Form 36 physical (PCS) and mental (MCS) component summaries were assessed. For statistical analysis classification and regression trees, linear regression and non-parametrical tests were used.

RESULTS

At follow-up, all clinical scores showed significant improvement compared to preoperative values (delta VAS 4.1±2.9, delta ODI 32.1±17.2, delta PCS 4.9±2.3 and delta MCS 4.2±1.7; P<0.001, respectively).PCS improvement was significantly decreased in patients with higher grades of disc herniation (P<0.001) and spondylolisthesis (P=0.011) as well as with larger cross-sectional area (CSA) of the dural tube at disc level (P=0.043). PCS improvement was significantly higher in patients with high intervertebral disc height (P=0.006) and high grades of vertebral body sclerosis (P=0.002). Patients with high BMD and initially low AP diameter of intervertebral foramina showed a significantly higher improvement of ODI (P<0.05).

CONCLUSION

In patients treated with dynamic posterior stabilization, postoperative clinical improvement was predicted by the following CT parameters: high grades of vertebral body sclerosis, spondylolisthesis or disc herniation, high BMD and disc space height, larger CSA of the dural tube and AP diameter of intervertebral foramina. Preoperative evaluation of these CT parameters therefore may improve therapy selection for patients with degenerative disease of the lower spine.

CLINICAL RELEVANCE/APPLICATION

The identified CT parameters predict post-surgical outcome and therefore support appropriate therapy selection for patients with painful degenerative segmental instability of the lower spine.

RC205-04 Accuracy and Efficacy of Fluoroscopic guided Pars Interarticularis Injections on Immediate and Short-Term Pain Relief

Monday, Nov. 30 9:20AM - 9:30AM Location: N228

Participants
Lloyd M. Kershen, MD, Charlottesville, VA (*Abstract Co-Author*) Nothing to Disclose
Nicholas C. Nacey, MD, Charlottesville, VA (*Abstract Co-Author*) Nothing to Disclose
James Patrie, MS, Charlottesville, VA (*Abstract Co-Author*) Nothing to Disclose
Michael G. Fox, MD, Charlottesville, VA (*Presenter*) Stockholder, Pfizer Inc;

PURPOSE

To determine the accuracy and short-term efficacy of fluoroscopic guided steroid and anesthetic injections for symptomatic pars interarticularis (pars) defects.

METHOD AND MATERIALS

Following IRB approval, all fluoroscopically guided injections of symptomatic pars defects at a single institution from June 2010 to

Following IRB approval, all fluoroscopically guided injections of symptomatic pars defects at a single institution from June 2010 to October 2014 were retrospectively and independently reviewed by two MSK radiologists with 2 and 13 years of post-fellowship experience to determine if the injections from a single procedure were all intra-pars (n=48), all peri-pars (n=3), or partially intra-pars (n=6). The patient's pain score graded on a 0-10 numeric pain scale was recorded pre-injection, 5-10 minutes and 1 week post-injection. Age, gender, pre-pain level and fluoroscopic times were recorded. Univariate and multivariate statistical analysis were performed.

RESULTS

A total of 57 procedures (106 pars injections) were performed on 41 patients (mean age 37; 21M,20F). Exact agreement between the 2 readers was present in 86% (49/57) of the procedures with a consensus intra-pars location recorded in 91.5% (97/106) of injections. The mean pre-injection and 5-10 minute post-injection pain scores for the all intra-pars procedures was 5.9 and 2.9, respectively with a mean change in pain of -3.0 (95% CI -3.8, -2.2; p<0.001). For the all intra-pars procedures with a 1-week post-injection pain score recorded (n=18 pts; 34 pars), the mean 1-week post-injection change in pain was -0.8 (95% CI -1.8, 0.2; p=0.10).The mean pre-injection and 5-10 minute post-injection pain scores for the 9 peri-pars/partially-in procedures were 6.1 and 3.4, respectively with a mean change in pain of -2.7 (95% CI -4.5, -0.9; p<0.004).When accounting for radiologist performing the procedure, the mean fluoroscopic time per pars injected was 43 s (CI 37, 50) for the all intra-pars group versus 73 s (CI 52, 103) for the peri-pars injections (p=0.001).

CONCLUSION

Fluoroscopically guided intra-pars injections for symptomatic spondylolysis can be performed accurately in ~90% of cases with minimum fluoroscopic time. There is statistically significant pain reduction immediately following the procedure, with a trend in pain reduction at one week.

CLINICAL RELEVANCE/APPLICATION

Symptomatic pars interarticularis defects can be successfully injected with limited fluoroscopic time in ~90% of cases with significant immediate pain relief, obviating the need for CT to perform these injections

RC205-05 Acute Myelopathy Following Epidural and Spinal Anesthesia

Monday, Nov. 30 9:30AM - 9:40AM Location: N228

Participants
Ruth Eliahou, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Alexander Losus, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose
Eliel Ben-David, MD, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose
John M. Gomori, MD, Jerusalem, Israel (*Abstract Co-Author*) Consultant, Medymatch Technology Ltd
Asaf Honig, MD, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Spinal and epidural anesthesia (E-SA) are widely used and generally considered as safe procedures. However, rarely, myelopathy may develop acutely and may result in permanent neurological sequela. This study suggests three different mechanisms of post-procedure myelopathy including direct cord injury, toxic/allergic myeloradiculitis and cord ischemia.

METHOD AND MATERIALS

Over 300 medical files of an acute myelopathy were reviewed. Patients presenting acute myelopathies appearing within 24 hours after E-SA were included.

RESULTS

12 patients (mean age 44.7, range 25-74 years) presenting progressive spinal motor, sensory and autonomic dysfunction within 3-24 hours following E-SA met inclusion criteria. 4/12 women (ages 25-30 years) manifested acute myeloradiculitis. MRI showed cord and cauda equina nerve root enhancement and T2 hyperintense cord lesions, suggesting toxic/ allergic reaction. 7/12 patients (32-71 years) presented Brown-Seequard-like symptoms with detrusor instability in conus medullaris injuries (6 patients) or tetraparesis in cervical cord injury (1 patient). Most cases showed unilateral cord injury. MRI showed focal blood products on SWI and cord edema at the site of injection. Follow up MRI showed decreased edema with syrinomyelia as a late sequela in all cases, consistent with direct traumatic damage to the spinal cord.One 74 year old patient developed restricted diffusion on DWI-MRI and central grey matter T2 signal cord abnormality, suggesting local hypoperfusion and cord ischemia.

CONCLUSION

Acute myelopathy may develop following E-SA due to direct traumatic cord injury, toxic/allergic response or cord ischemia, with possibility of permanent neurological damage. Focal syringomyelia as a late sequela is typical.Characteristic MRI findings aid with the diagnosis and management.

CLINICAL RELEVANCE/APPLICATION

Acute myelopathy following spinal and epidural anesthesia is a rare but serious complication with potential for permanent neurological sequelae. SWI and DWI -MRI sequences aid the diagnosis and help characterize the mechanism of injury.

RC205-06 Epidural Steroid Injections for Spinal Stenosis: Helpful or Harmful?

Monday, Nov. 30 9:40AM - 10:10AM Location: N228

Participants
Jeffrey G. Jarvik, MD, MPH, Seattle, WA, (jarvikj@uw.edu) (*Presenter*) Co-founder, PhysioSonics, Inc; Stockholder, PhysioSonics, Inc; Intellectual property, PhysioSonics, Inc ; Consultant, HealthHelp, LLC; Author, Springer Science+Business Media Deutschland GmbH; Advisory Board, General Electric Company; Consultant, Alphabet Inc

LEARNING OBJECTIVES

1) Review the rationale and design of the Lumbar Epidural Steroid injections for spinal Stenosis (LESS) study. 2)Examine the results of the LESS study. 3) Discuss the limitations of LESS study. 4) Discuss the policy implications of the LESS conclusion: in the

treatment of lumbar spinal stenosis symptoms, epidural steroid injections offered minimal to no benefit compared to epidural injections of lidocaine at six weeks.

ABSTRACT

The Lumbar Epidural Steroid injections for spinal Stenosis (LESS) study was double-blind study comparing epidural steroid injections (ESIs) with lidociaine to lidocaine injections alone. The study included 400 patients with back and leg pain from lumbar spinal stenosis who were randomized to receive either an epidural injection containing lidocaine or an epidural injection containing lidocaine plus a glucocorticoid. Sixteen U.S. centers participated in the study.Compared to injections with local anesthetic alone, injections with glucocorticoids provided these patients with minimal or no additional benefit. The primary outcomes were the Roland-Morris Disability Questionnaire and a leg pain numerical rating scale. Patients who received glucocorticoid reported greater satisfaction with treatment, with 67% of those patients reporting being very satisfied or somewhat satisfied compared to 54% of those who received lidocaine alone reporting the same level of satisfaction with the treatment. There were more adverse events in the patients who received the injections that included glucocorticoid. Furthermore, patients receiving the combination injections were more likely to have low morning serum cortisol levels at 3 weeks and 6 weeks after the injection, suggesting that the corticosteroid may have a broad systemic effect.In conclusion, for the treatment of lumbar spinal stenosis symptoms, ESIs offered minimal to no benefit compared to epidural injections of lidocaine at six weeks.; The small improvement with corticosteroid observed at 3 weeks was due solely to the interlaminar approach and not transforaminal approach injections. There is evidence of sustained systemic effects of the corticosteroid including cortisol suppression that should be considered, particularly in older adults.

RC205-07 Lumbar Disc Nomenclature 2.0: Recommendations of the Combined Task Force

Monday, Nov. 30 10:20AM - 10:50AM Location: N228

Participants
Gordon K. Sze, MD, New Haven, CT (*Presenter*) Investigator, Remedy Pharmaceuticals, Inc

LEARNING OBJECTIVES

1) To understand the scope and nature of the revisions of the lumbar disc nomenclature update, version 2.0. 2) To investigate the rationale for the revisions. 3) To comprehend the most important revisions.

ABSTRACT

'Lumbar disc nomenclature: version 2.0. Recommendations of the combined task forces of NASS, ASSR, and ASNR' is the updated and revised version of the original 'Nomenclature and classification of lumbar disc pathology' and is the product of a multidisciplinary effort over the course of nearly 10 years. The revised document resembles the original in format and language, but provides changes that are consistent with current concepts in radiologic and clinical care. The modifications center on: 1. updating and expanding the text, glossary, and references; 2. revision of the figures; 3. emphasizing the term anular fissure to replace anular tear; 4. refinement of the definitions of acute and chronic disc herniations; 5. revision of the differentiation between disc herniation and bulging disc. Several other minor amendments were also made, such as deleting the section on Reporting and Coding, which was outdated in the original and would become outdated in the current update as soon as it was published.

RC205-08 Assessment of Sensitivity and Radiologic Reporting of Oncologic Epidural Lesions on Body CT: A 12-year Retrospective Review

Monday, Nov. 30 10:50AM - 11:00AM Location: N228

Awards
Trainee Research Prize - Fellow

Participants
Lauren M. Kim, MD, Bethesda, MD (*Presenter*) Nothing to Disclose
Evrim B. Turkbey, MD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Ronald M. Summers, MD, PhD, Bethesda, MD (*Abstract Co-Author*) Royalties, iCAD, Inc; Research funded, iCAD, Inc;

PURPOSE

Metastatic epidural spinal cord compression is a debilitating neurological complication which occurs in approximately 5-10% of patients with terminal cancer. Early detection of epidural lesions commonly actuates treatment which can prevent and even reverse this process, thereby substantially improving a patient's quality of life. Given the inherent difficulty of seeing epidural lesions on body CT due to their relatively small size and low contrast from surrounding tissues, we hypothesized that oncologic epidural lesions were being under-reported by radiologists interpreting body CT.

METHOD AND MATERIALS

A search of our institution's radiology information system identified patients who underwent a body CT within 30 days before or after undergoing a spine MRI. A board-certified radiologist then reviewed these CT and MRI examinations and the respective patients' medical records to determine etiology and location of the epidural mass, whether the epidural mass reported on MRI was plainly visible on CT, and whether an epidural mass plainly visible on body CT was reported by the interpreting radiologist.

RESULTS

From 09/01/2001 to 12/31/2013, there were 340 spine MRIs demonstrating at least one epidural mass of oncologic etiology with a body CT performed within 30 days. An epidural mass reported on MRI was plainly evident in 244 (71.7%) of the 340 body CTs. Of these 244 body CTs representing 129 unique patients, 61 CT reports (25.0%) did not mention the presence of an epidural mass, even in some cases wherein an MRI examination preceded and reported its presence (27 of 61 cases; 44.3%). There was no statistically significant correlation with respect to the omission of CT reporting and patient gender, age, primary diagnosis, epidural mass location, reporting radiologist, CT or MR scanner, or preceding MRI diagnosis of an epidural mass (univariate chi-squared analysis; $p < 0.05$).

CONCLUSION

In this retrospective analysis, body CT is 71.7% sensitive in detecting an epidural mass of oncologic etiology which is demonstrable on MRI. Additionally, oncologic epidural masses are commonly (25.0%) unreported on body CT, even in cases where there is preexisting imaging evidence to confirm their presence.

CLINICAL RELEVANCE/APPLICATION

Given the moderate sensitivity of body CT in demonstrating epidural masses, radiologists should incorporate the integrity of the spinal canal into their body CT search pattern for oncologic patients.

RC205-09 Lumbar MR Imaging: Does Epidemiologic Data in Radiology Reports Affect Patient Management and Outcomes in the Primary Care Setting?

Monday, Nov. 30 11:00AM - 11:10AM Location: N228

Participants
Jessica G. Fried, MD, Lebanon, NH (*Presenter*) Nothing to Disclose
Brook I. Martin, MPH, Lebanon, NH (*Abstract Co-Author*) Nothing to Disclose
David A. Pastel, MD, Lebanon, NH (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

A significant challenge to the appropriate diagnosis and management of low back pain is that lumbar MRI commonly reveals numerous findings that can be considered pathologic, even in asymptomatic individuals. Referring primary care providers may not understand the epidemiologic significance of the findings in the lumbar MRI reports they use to make patient-care decisions, potentially leading to unnecessary specialist referrals and overly aggressive treatment plans.

METHOD AND MATERIALS

A verified epidemiologic statement regarding prevalence rates of common findings in asymptomatic patients was included in all relevant lumbar MRI reports beginning July 01, 2013 at a single academic medical center. Patients referred for lumbar MRI by in-network primary care providers for uncomplicated low-back pain were followed prospectively for one year. Chart-review was utilized to capture health care utilization rates following MRI, including physical therapy referral, narcotic prescription, specialist referral, and spine surgery. A pre-statement-implementation cohort was compared to a post-statement-implementation cohort.

RESULTS

There were 323 patients who met inclusion criteria for the study, with 154 in the pre-statement cohort and 169 in the post-statement cohort. There was no significant difference in baseline demographic characteristics between the two cohorts. After one year of follow-up, there was a trend in decreased referral to spine specialists (53.6% v. 46.0%, p=0.234) and lumbar spine surgeries performed(10.9% v. 7.1%, p=0.290) when comparing the pre-statement cohort to the post-statement cohort. There were no apparent differences in referral for physical therapy or narcotic prescription rates in the study.

CONCLUSION

While the study is limited by small sample size, the trend in decreased referral to spine specialists by primary care physicians and fewer surgeries performed with the implementation of the statement motivates further investigation into the utility of enhancing imaging reports with epidemiologic information. This simple intervention may have meaningful impact on the management of these patients by referring primary care physicians.

CLINICAL RELEVANCE/APPLICATION

The addition of a simple, verified epidemiologic statement to lumbar MRI reports may impact the medical management of low-back pain in the primary care setting.

RC205-10 Open Surgical Biopsy of Degenerated Discs with Correlation of Associated MRI Modic Changes

Monday, Nov. 30 11:10AM - 11:20AM Location: N228

Participants
Mark Georgy, Escondido, CA (*Presenter*) Nothing to Disclose
Mark Stern, MD, Escondido, CA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Recent publication had suggested evidence of chronic infection of degenerated disc spaces with Propionibacterium Acnes (PA) as a cause of chronic back pain that linked to type I Modic changes. Researches had advocated for antibiotic treatment of patients with chronic back pain. This had created extensive debate in the medical community. We are presenting our pilot data as a part of larger NIH prospective study of serial biopsies of degenerative disc spaces during open surgery.

METHOD AND MATERIALS

An IRB approval was obtained to conduct this retrospective study in a multicenter single neurosurgery practice over a 9-month period. Biopsies were obtained from the disc space during open surgery when possible for all patients who underwent surgery for degenerative disc disease. Biopsy materials were sent for gram stain and culture in all cases. Pre operative MRI images were evaluated for the presence of Modic changes.

RESULTS

Complete data were available from 21 lumbar disc surgeries, 10 of them (48%) had a positive culture. 5 levels were positive for PA, one level was positive for S. Aureus, one level was positive for Actinomycen and three levels were positive for S. Epidermis. There were a total of 7 cases with Modic changes and none of them were positive for PA.Biopsies were collected from 26 cervical cases, and 9 of them (35%) showed a positive biopsy. There were 16 cases with Modic changes that included 6 (37.5%) of the positive cultures. Three of the positive cultures showed no Modic changes. 10 cases with Modic changes had a negative culture

CONCLUSION

Our results concur with the published date of high incidence of PA infection of the degenerated nucleus. However we did not show any constant relationship to Modic changes which could be due to the small sample size. The etiology of Modic changes may be related to factors other than infectious processes. Furthermore, the patho-physiology of the Modic changes in the cervical and lumbar spine could be different. Further evaluation of these results with a larger prospective controlled study is underway.

CLINICAL RELEVANCE/APPLICATION

There may be a high incidence of P Acne infection in the degenerated discs. However, there may not be a constant relationship to Modic changes.

RC205-11 Lumbar Plexus in Patients with Chronic Inflammatory Demyelinating Polyneuropathy: Evaluation with New MR Neurography (3D SHINKEI)

Monday, Nov. 30 11:20AM - 11:30AM Location: N228

Participants
Akio Hiwatashi, MD, Fukuoka, Japan (*Presenter*) Nothing to Disclose
Osamu Togao, MD, PhD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Koji Yamashita, MD, PhD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazufumi Kikuchi, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Masami Yoneyama, Tokyo, Japan (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Hiroshi Honda, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Magnetic resonance neurography is useful to evaluate nerves in patients with inflammations, tumors, and trauma. The purpose of this study was to evaluate feasibility of 3D nerve-sheath signal increased with inked rest-tissue rapid acquisition of relaxation enhancement Imaging (3D SHINKEI) in the ganglions and the nerves of lumbar plexus in patients with chronic inflammatory demyelinating polyneuropathy (CIDP).

METHOD AND MATERIALS

This study included 12 patients with CIDP (9 males and 3 females; age range 14-66 year-old; median 34 year) and 13 normal subjects (10 males and 3 females; age range 27-81 year-old; median 53 year). 3D SHINKEI is a turbo spine echo with a diffusion-weighted prepulse called improved motion-sensitized driven equilibrium. The imaging parameters were as follows; TR/TE = 2500/90 ms, FOV = 280 x 280 mm, voxel size = 0.98 x 0.98 x 2.0 mm^3, b = 10 s/mm^2, acquisition time = 5 min 48 s. Regions of interests (ROIs) were placed at the ganglions and nerves from T12 to L5 bilaterally. Signal-to-noise ratio (SNR) and contrast-radio (CR) were calculated. The size of the ganglions and the nerves was also measured. Statistical analyses were performed with Mann-Whitney U test. P-values less than 0.05 were considered significant.

RESULTS

The size of the ganglions and the nerves was larger in patients with CIDP (6.80 ± 1.90 mm and 5.81 ± 2.72 mm) than in normal subjects (5.22 ± 1.15 mm and 4.25 ± 1.08 mm, $P < 0.0001$, respectively). SNR of the ganglions and the nerves was larger in patients with CIDP (539.73 ± 789.57 and 519.31 ± 882.72) than in normal subjects (89.85 ± 91.29 and 44.03 ± 55.19, $P < 0.0001$, respectively). CR of the ganglions and the nerves was larger in patients with CIDP (0.74 ± 0.11 and 0.66 ± 0.16) than in normal subjects (0.72 ± 0.10 and 0.48 ± 0.16, $P < 0.05$ and $P < 0.0001$, respectively).

CONCLUSION

With 3D SHINKEI we could obtain high-resolution MR neurography. CIDP could be discriminated from normal subjects on 3D SHINKEI.

CLINICAL RELEVANCE/APPLICATION

With 3D SHINKEI we can evaluate the size and signal intensity of the lumbar plexus and can discriminate patients with CIDP from normal subjects.

RC205-12 Magnetic Resonance Neurography as an Adjunct for Back Pain and Extraspinal Sciatica

Monday, Nov. 30 11:30AM - 12:00PM Location: N228

Participants
John A. Carrino, MD, MPH, New York, NY (*Presenter*) Consultant, BioClinica, Inc; Consultant, Pfizer Inc; Advisory Board, General Electric Company; Advisory Board, Halyard Health, Inc; ;

LEARNING OBJECTIVES

1) Apply the critical technical elements for MR Neurography. 2) Comprehend the potential role for MR Neurography in spinal imaging. 3) Analyze pathologies identified with MR Neurography.

ABSTRACT

Neuromuscular imaging with MR neurography can be challenging technically because of requirements for high spatial resolution sometimes over an extended field of view such as an entire extremity unless the lesion or symptoms are well localized. Thus the concept of a "target zone" is useful to tailor protocols for high resolution portions. The trend is to use 3T MRI because of increased signal to noise ratio (SNR). The use of surface coils combinations may be needed to cover the entire region of interest or to evaluate distal muscles innervated. The availability of 3D isotropic pulse sequences avoids multiple 2D planar acquisitions and facilitates arbitrary reconstruction planes along and orthogonal to the structures of interest. The administration of intravenous contrast material is typically selectively used for mass lesions, post-operative situations or inflammatory conditions although dynamic contrast enhance MRI (DCE-MRI) has the potential to evaluate the vasa nervosum. Novel MRI techniques including diffusion-weighted imaging (DWI) and diffusion tensor imaging (DTI) may have a role in MR Neurography. Whole body MRI (WBMRI) has also been applied for MR Neurography. The general indication for MR Neurography is a suspected peripheral nerve dysfunction and is complementary to electrodiagnostic testing (e.g. electromyography). Broad categories of indications include confirming a diagnosis (e.g. brachial neuritis), elucidating pathoanatomy (e.g. thoracic outlet syndrome), establishing the location of a lesion for (e.g. nerve avulsion for pre-surgical planning), to evaluate unexplained neuromuscular symptoms (e.g. extra-spinal sciatica with a normal lumbar spine MRI) or to exclude a neoplasm (e.g. neurofibroma). MR Neurography can also be an adjunct to spine imaging. MRI findings may be related to nerve, muscle or compressive etiology (tumor, pathoanatomy or predisposing variant). Normal peripheral nerves will often although not invariably show a fasicular appearance on axial images. Contrast enhancement cannot always distinguish different pathoetiologies of neuropathy and is more likely to be abnormal with an inflammatory or neoplastic etiology. Endoneurial fluid increases when nerve is compressed, irritated or injured, leading to nerve image hyperintensity in an MR Neurography image. Acute axonal nerve lesions cause a hyperintense signal on T2-weighted images at and distal to the lesion site

corresponding to Wallerian degeneration. Denervation produces a non-specific muscle edema-like signal alteration. Muscle signal alteration occurs within a few days (as early as 72 hours) of denervation. Muscle atrophy is a late finding likely reflecting disuse. Fatty replacement (retained bulk and contour of muscle with fibers replaced by fat) is associated with neuromuscular etiologies (neurogenic or myogenic) or inflammatory myopathies. The MRI signal changes are reversible when the recovery of motor function occurs as a result of further muscle innervation. Tumor related neuropathy may be caused by a primary nerve neoplasm or a lesion compressing or infiltrating the nerve. Peripehral nerve sheath tumors (PNST) include neurilemmoma (schwanoma) and neurofibroma. The majority of PNST lesions are benign. Malignant PNST (MPNST) typically occurs in the setting of neurofibromatosis. It may be difficult for MRI to distinguish benign from malignant PNST and currently FDG PET has a role showing increased uptake in malignancies. Larger heterogeneous appearing lesions that have changed over time, either by clinical symptoms or imaging features suggests MPNST. Compressive lesions include non-neoplastic tumors (ganglions, hematoma), benign neoplasms (osteochondromas) or malignant neoplasm (sarcoma) that residing along the course of a nerve or within a fibro-osseous tunnel. Nerve infiltration and invasion may occur from lymphoma or metastatic neoplasm.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

John A. Carrino, MD, MPH - 2013 Honored Educator
John A. Carrino, MD, MPH - 2015 Honored Educator

RC206

Head and Neck Top Five: Important Anatomy, Missed Diagnoses and Imaging Pearls

Monday, Nov. 30 8:30AM - 10:00AM Location: E450A

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC206A Important Head and Neck Anatomy

Participants
Hugh D. Curtin, MD, Boston, MA, (Hugh_Curtin@meei.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will be able to identify the key 'fat pads' at the exit points of those cranial nerves most often affected by perineural spread. 2) The participant will be able to describe the fasical organization of the parapharyngeal region. 3) The participant will be able to locate the laryngeal ventricle using axial and coronal imaging.

ABSTRACT

Important Anatomy Head and neck imaging relies heavily on an undestanding of the intricate and often difficult anatomy. The session will focus on identification of anatomy that is crucial in a defining the margins and patterns of spread of pathology. Other landmarks that are key to description of the location of lesions are also covered. For instance, there is a small amount of fat located just external to each neural foramen through which perineural spread of carcinoma may pass. The most important of these primary 'fat pads' are located in the pterygopalatine fossa (external to foramen rotundum), just inferior to foramen ovale (trigeminal fat pad), and the stylomastoid foramen (facial nerve) fat pad. These fat pads should be examined for potential obliteration as tumor approaches the foramen. The laryngeal ventricle is key to the organization of the larynx and reports should localize lesions related to this important structure. The ventricle may not be directly visible depending on the phase of respiration of an imaging scan. However the lateral wall of the larynx transitions from fat to muscle at the level of the ventricle. The ventricle is located at the upper margin of the thyroarytenoid muscle that makes up the bulk of the true vocal cord. The parapharyngeal spaces are crossed by several substantial fascial layers. The fascia organize the region into compartments that help the radiologist predict the identity of tumors in that location. Specfically, the anatomy makes it possible to separate tumors that are almost certainly of salivary origin from those that are not. Other specific anatomic points useful in interpretation or characterizaton will also be discussed.

RC206B Missed Diagnoses in the Head and Neck

Participants
Phillip R. Chapman, MD, Birmingham, AL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify some of the most common mistakes radiologists make when evaluating MRI or CT scans of the neck and skull base. 2) Identify different patterns of perineural tumor spread (PNTS) and understand the subtle CT and MRI changes that indicate early PNTS. 3) Recognize atypical patterns of metastatic nodal disease and how it can be missed on routine CT scans. 4)Identify changes in the nasopharynx and skull base that indicate invasive infectious or neoplastic process. 5) Identify easily missed superficial lesions of the dermis that might represent primary cutaneous tumor or dermal metastases.6) Understand the basic anatomy of the oral cavity including specific anatomiuc subunits, the appearance of oral cavity neoplasms and pitfalls in imaging oral cavity cancers.

ABSTRACT

This presentation will highlight some of the most common mistakes and misdiagnoses that radiologists make when interpreting head and neck studies, including MRI and CT examinations. Many 'misses' are difficult, and rely on identifying subtle changes in small structures in the complex landscape of the neck and skull base. Other misses are difficult because they are relatively rare and may not be on the radar of most radiologists. Some misdiagnoses are the result of satisfaction of search, and are observed in complex cases, especially complex head and neck cancer. Post treatment changes in the neck impose additional limitations on imaging of the head and neck. This lecture will identify some common mistakes that are made in both private and academic practices.Cases will be presented using a case-based approach.They keys to identifying the pertinent findings and making each diagnosis will be highlighted.

RC206C Head and Neck Imaging Pearls

Participants
Christine M. Glastonbury, MBBS, San Francisco, CA, (Christine.glastonbury@ucsf.edu) (*Presenter*) Author with royalties, Reed Elsevier

LEARNING OBJECTIVES

1) To learn the key points that create a succinct imaging differential diagnosis while appreciating the 'big picture' in HandN imaging. 2) To recognize the imaging findings of critical disease and what to do or recommend next with your patient.

ABSTRACT

This session will review some important pearls in head and neck imaging. These tips and tricks will review some important aspects of

imaging in the head and neck to help with protocoling studies, as well as techniques for imaging and interpretation. Important imaging differentials will also be reviewed and discussed.

RC207

Genitourinary Series: Prostate MR 2015: Current Role in Staging and Surveillance and Intervention

Monday, Nov. 30 8:30AM - 12:00PM Location: N227

GU MR OI

AMA PRA Category 1 Credits ™: 3.50
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Peter L. Choyke, MD, Rockville, MD, (pchoyke@nih.gov) (*Moderator*) Researcher, Koninklijke Philips NV Researcher, General Electric Company Researcher, Siemens AG Researcher, iCAD, Inc Researcher, Aspyrian Therapeutics, Inc Researcher, ImaginAb, Inc Researcher, Aura Biosciences, Inc

LEARNING OBJECTIVES

1) To understand why prostate cancer is currently under- and over-diagnosed. 2) To understand the role of multiparametric prostate MRI in guiding biopsy of the prostate. 3) To understand the role in the diagnosis, surveillance and recurrence of cancer. 4) To review current progress in the focal treatment of prostate cancer.

ABSTRACT

The paradox of prostate cancer is that it is currently being overdiagnosed and underdiagnosed. PSA and blind biopsy has resulted in the overtreatment of men with low risk disease and the undertreatment of men with intermediate high risk tumors that evade blind biopsy. Multiparametric MRI is a major breakthrough in the diagnosis of prostate cancer. Moreover it can be used to monitor patients for active surveillance and guide treatment. New standards for reporting of prostate MRI have been recently development. This course will not only review these important developments but will provide new research results to participants.

Sub-Events

RC207-01 Intro to Prostate Cancer

Monday, Nov. 30 8:30AM - 8:55AM Location: N227

Participants
Peter L. Choyke, MD, Rockville, MD, (pchoyke@nih.gov) (*Presenter*) Researcher, Koninklijke Philips NV Researcher, General Electric Company Researcher, Siemens AG Researcher, iCAD, Inc Researcher, Aspyrian Therapeutics, Inc Researcher, ImaginAb, Inc Researcher, Aura Biosciences, Inc

LEARNING OBJECTIVES

1) To understand the limitations of PSA screening and random prostate biopsy. 2) To introduce the concepts of novel screening tests and genomic analysis of prostate biopsies. 3) To review the importance of MRI in improving tumor localization, guiding biopsy, monitoring active surveillance and focally ablating prostate cancer.

ABSTRACT

See overview abstract

ABSTRACT

The diagnosis of prostate cancer is evolving quickly. There is increasing recognition that the combination of routine PSA screening and random prostate biopsy overdiagnoses low grade disease and underdiagnoses high grade disease. Autopsy studies show that the normal prostate harbors many low grade and microscopic cancers that never becomes clinically apparent. On the other hand, random biopsies undersample the anterior prostate gland. More accurate screening tests (e.g. PCA-3) are under development for determining which men warrant biopsy. Genomic testing of prostate biopsy samples is also becoming more common and it is thought to improve the prediction of tumor aggressiveness. The increased use of genomics to guide therapy clearly requires that the biopsy sample be representative of the tumor. MR guided biopsies, whether performed in gantry or using MR-US fusion, will improve the quality of the prostate biopsy specimen enabling more accurate genomic testing. Armed with more accurate and reliable tissue diagnosis, more rational decisions regarding active surveillance and/or focal therapy can be made. This course will review advances in MR guided diagnosis, biopsy and therapy of prostate cancer.

RC207-02 Detection and Characterization of Prostate Cancer with Multiparametric MRI (mpMRI): Do Learning and Experience Matter for Diagnostic Accuracy?

Monday, Nov. 30 8:55AM - 9:05AM Location: N227

Participants
Rajan T. Gupta, MD, Durham, NC (*Presenter*) Consultant, Bayer AG; Speakers Bureau, Bayer AG; Consultant, Invivo Corporation
Daniele Marin, MD, Cary, NC (*Abstract Co-Author*) Nothing to Disclose
Bhavik N. Patel, MD,MBA, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Kirema Garcia-Reyes, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Kingshuk Choudhury, PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Lisa M. Ho, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Tracy A. Jaffe, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Thomas J. Polascik, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate effect of dedicated reader education on accuracy/Gleason score estimation of index and anterior prostate cancer (PCa) diagnosis with mpMRI in attending radiologists compared to abdominal imaging fellows.

METHOD AND MATERIALS

4 blinded attending abdominal imagers with 2-16 years of experience evaluated 31 prostate mpMRIs in this IRB-approved, HIPAA-compliant, retrospective study for index lesion and anterior PCa detection (including Gleason score estimation). Following dedicated education program, readers reinterpreted cases after a 2-4 month memory extinction period, blinded to initial reads. Reference standard was established combining whole mount histopathology with mpMRI findings by a board-certified radiologist with 5 years of prostate mpMRI experience. Multivariate analysis was performed to assess the effects of learning and reader experience. Results for attending radiologists were then compared with prior reader study results in radiology fellows (using the same set of cases).

RESULTS

Index cancer detection (attending vs. fellow): pre-education accuracy 64.5% vs. 74.2%; post-education accuracy 71.8% vs. 87.7% (p=0.12 vs. p=0.003). Gleason score estimation (index): pre-education accuracy 46.8% vs. 54.8%; post-education accuracy 57.3% vs. 73.5% (p=0.04 vs. p=0.0005). Anterior PCa detection: pre-education accuracy 46.4% vs. 54.3%; post-education accuracy 75% vs. 94.3% (p=0.02 vs. p=0.001). Gleason score estimation (anterior): pre-education accuracy 42.9% vs. 45.7%; post-education accuracy 67.9% vs. 80% (p=0.03 vs. p=0.002). These effects were all attributable to learning and not to reader experience based on multivariate analysis.

CONCLUSION

Accuracy of anterior PCa detection and Gleason score estimation for both index and anterior cancers significantly increased following dedicated reader education for both attendings and fellows. In addition, accuracy for index cancers was statistically significantly improved for fellows post-education. The degree of statistically significant improvement was higher for fellows vs. attendings overall.

CLINICAL RELEVANCE/APPLICATION

Performance in detection and characterization of PCa on mpMRI can be improved with dedicated reader education, however, it may be that the earlier the educational intervention is done, the more significant the improvement.

RC207-04 Abbreviated Prostate MRI (AP-MRI)

Monday, Nov. 30 9:15AM - 9:25AM Location: N227

Awards
RSNA Country Presents Travel Award

Participants
Robin Bruhn, Aachen, Germany (*Presenter*) Nothing to Disclose
Simone Schrading, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Christiane K. Kuhl, MD, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

It has recently been shown that an Abbreviated MRI Protocol is suitable for breast cancer screening. Aim of this study was to investigate whether an Abbreviated Prostate MRI protocol (AP-MRI), consisting of 2 pulse sequences only (high resolution T2-TSE and DWI in a single plane), acquired without endorectal coil, is sufficient to diagnose prostate cancer (PCa) in men presenting with elevated PSA-levels.

METHOD AND MATERIALS

Ongoing prospective reader study on 222 men (mean age 53.6 years) with median PSA of 7.1 who underwent multiparametric 3.0T-MRI with multi-element surface coil. The AP-MRI took a table time of just under 10 min. The full diagnostic protocol (FDP) took 30 min and included the pulse sequences of the AP-MRI (0.4 mm in-plane axial T2-TSE and DWI with 4 b-values up to 1400 s/mm²), plus additional T2-TSE planes, coronal T1-TSE, and DCE. All MRI studies were read prospectively by two GU-radiologists in consensus according to PIRADS 2.0. Readers first read the AP-MR images and made their diagnoses. Then, they read the FDP. Results of MR-guided biopsy, TRUS/saturation biopsy, and/or final surgical pathology, or MRI and PSA follow up of at least 24 months served as SOR.

RESULTS

PCa was finally diagnosed in 85/222 men (38.3%), with median size 12 mm, classified as Gleason-6 in 25 patients, Gln-7 in 31, Gln ≥ 8 in 29. Diagnostic indices of the AP-MRI vs. the FDP were: Sensitivity: 93% (79/85) vs. 94% (80/85); Specificity: 89% (122/137) vs. 87% (120/137); PPV: 84% (79/94) vs. 82% (80/97), NPV: 95% (122/128) vs. 96% (120/125). The single cancer that went undetected by AP-MRI was a Gln-6-cancer diagnosed by DCE. A total five additional cancers (Gln-6 in 3, and Gln-7 in 2 patients) went undetected by both, AP-MRI and FDP, and were detected by TRUS biopsy. NPV for biologically relevant prostate cancer (> Gln-6) was 98.8% (95%CI: 95.7%-99.9%) for both, AP-MRI and FDP.

CONCLUSION

Abbreviated prostate MRI allows diagnosis of biologically relevant PCa in under 10 minutes magnet time, without endorectal coil and without contrast agent, and offers a diagnostic accuracy that is equivalent to that of a full state-of-the-art multi-parametric prostate MRI protocol.

CLINICAL RELEVANCE/APPLICATION

Abbreviated prostate MRI, if confirmed by further studies, may open the door for systematic MRI screening for prostate cancer.

RC207-05 The Natural History of Low-grade Prostate Cancer: Lessons from an Active Surveillance Cohort

Monday, Nov. 30 9:25AM - 9:35AM Location: N227

Participants
Francesco Giganti, MD, Milan, Italy (*Presenter*) Nothing to Disclose
Neophytos Petrides, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Caroline M. Moore, London, United Kingdom (*Abstract Co-Author*) Speakers Bureau, Myriad Genetics, Inc; Research Grant,

GlaxoSmithKline plc; Consultant, STEBA Biotech NV
Mark Emberton, London, United Kingdom (*Abstract Co-Author*) Consultant, GlaxoSmithKline plc; Consultant, sanofi-aventis Group; Consultant, Glide Pharmaceutical Technologies Limited; Consultant, SonaCare Medical, LLC
Clare M. Allen, MBBCh, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Alex P. Kirkham, BMBCh, MD, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To describe the natural history of low-grade prostate cancer by mpMRI changes in patients under active surveillance (AS).

METHOD AND MATERIALS

This study had an authorization from our institutional ethics review board. From our database on patients with prostate cancer, a total of 86 were enrolled in an AS program and had their first mpMRI in 2012 or before. The two reading radiologists, in consensus, knew tumor location and PSA but were blinded to both patient demographics and date of scan. The scans were reported randomly (reducing any bias assuming an increase in size with time). For each visible lesion we measured volume on the sequence best showing the tumor (the same for all scans), as well as attributing a score based on the European Society of Uroradiology -ESUR-2012 guidelines.

RESULTS

1. 66/86 patients had Gleason 3+3 and 20/86 Gleason 3+4 tumor. Median maximum cancer core lengths were 1 and 3.5 mm, respectively.2. 38/86 patients did not have a visible lesion on the initial MRI (< 3, ESUR criteria). Of these patients, none had developed at a median of 3.56 years of follow up.3. 40/86 patients had a lesion scoring 3/5 or more (ESUR criteria) on more than 2 scans, enabling an estimation of annual growth rate. 25 had Gleason 3+3, and 15 Gleason 3+4. Median monthly increase in volume was 0.4% for Gleason 3+3 and 1.2% for 3+4 (p=0.049, Mann-Whitney test). No significant difference in the median monthly PSA increase between these groups (0.9 vs 0.6%, p=0.42) was observed.4. In 38/40 patients having 2 scans separated by a median of 1.19 years, 9/38 showed a decrease in lesion size between 5 and 50 %.

CONCLUSION

In a group of men on AS, we never observed development of a convincing lesion in those negative on the first scan. Conversely, it was possible to measure a growth rate in visible tumors, and it was significantly different for Gleason 3+3 and 3+4. Finally, there is considerable inter-scan variability in volume: this must be taken into account when attrbuting a significant increase to a small lesion.

CLINICAL RELEVANCE/APPLICATION

The significant difference in rate of increase between small tumors of different grades under AS suggests that it is possible to monitor their size on MRI.

RC207-06 Multi-parametric MRI (including PIRADS)

Monday, Nov. 30 9:35AM - 10:00AM Location: N227

Participants
Clare M. Tempany-Afdhal, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The state of the art mpMR protocols/sequences for prostate cancer imaging. 2) How to acquire and interpret high quality images. 3) What ACR-Pi-Rads is and how it can be implemented in clinical practice. 4) Current and future role of Prostate MR and ACR- PiRads.

ABSTRACT

The current state of the art approaches to prostate cancer Multi-parametric MR(mpMR) Prostate imaging will be presented. MRI techniques at 1.5T and 3.0T and pulse seqeunce optimization for a state of the art mpMRI exam will be reviewed. The roles of each seqeunce will be illustrated with clinical case examples to outline technical aspects and interpretative approaches. As the examinations have become complex and the clinical demands are increasing there isa need for standarization of our techniques and interpretative reporting. Thus in keeping with Bi-Rads and Li-Rads, we are developing Pi-Rads. The current ACR-PiRads will be reviewed - goals, methods and clinical applications will be presented and future vision for the role of prostate MR and ACR-PiRADS will be presented

RC207-07 Active Surveillance with MRI

Monday, Nov. 30 10:05AM - 10:30AM Location: N227

Participants
Sadhna Verma, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) What is active surveillance and how it is done. 2) Who is a candidate for active surveillance. 3) The role of mpMRI in risk stratification for active surveillance. 4) The relevance of mpMRI in addition to clinical parameters in disease management.

ABSTRACT

ABSTRACT

Active Surveillance with MRI Active surveillance is increasingly acknowledged as a preferred strategy for most men with low-risk disease. This lecture will discuss low risk prostate cancer and how it is managed clinically. Role of mpMRI will be reviewed with clinical case examples to show selection, follow- up or possible removal of patients from active surveillance protocols.

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Sadhna Verma, MD - 2013 Honored Educator

RC207-08 Longitudinal Follow-up Study of Prebiopsy Multiparametric MRI with Cancer- Negative Findings in Patients with Suspicious Prostate Cancer: A Single Institution Experience

Monday, Nov. 30 10:30AM - 10:40AM Location: N227

Participants
Jun Gon Kim, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Chan Kyo Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jung Jae Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Byung Kwan Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Few follow-up studies of prebiopsy prostate multiparametric MRI (mpMRI) with cancer-negative findings have been reported. The aim of this study was to investigate the chance and characteristics of missing cancers on prebiopsy mpMRI with cancer-negative findings based on Prostate Imaging Reporting and Data System (PI-RADS) in patients with suspicious prostate cancer (PCa).

METHOD AND MATERIALS

584 consecutive patients (mean, 62.7 years; range, 30-86 years) with suspicious PCa who performed initial (n= 391) or repeated prostate biopsies (n= 193) were enrolled in this retrospective study. All patients underwent prebiopsy 3-T mpMRI including T2-weighted, diffusion-weighted and dynamic contrast-enhanced imaging. Random systemic core biopsies and MR-targeted core biopsies in cases of cancer-positive MRI findings were performed, while cases with cancer-negative MRI findings underwent random systemic core biopsies during subsequent follow-up. Biopsy-based definition of clinically significant cancer (CSC) was Gleason ≥ 3 + 4 or Gleason 6 with maximal cancer core length (MCL) ≥ 4 mm. The likelihood of PCa on mpMRI was evaluated based on PI-RADS version 2: score 4 or 5 was considered cancer positive.

RESULTS

Pathologically the cancers were found in 25% (146/584). The cancer-positive MRI findings were found in 17% (99/584) patients and of these, 85.9% (85/99) had pathologically cancer cores. Of 485 patients with cancer-negative MRI findings, a total of 61 (12.5%) had cancer cores [Gleason 6 (n= 42), 3 + 4 (n= 14), 4 + 3 (n= 2), 8 (n= 2), and 9 (n= 1)]: biopsy-naive patients (n= 38) and patients with negative previous biopsy (n= 23). The mean MCL was 3.4 mm (range, 1-12.6 mm). The CSCs were found in 47.5% (29/61). Accordingly cancer-negative MRI findings missed 6% (29/485) CSCs: 4.1% (20/485) in biopsy-naive patients and 1.9% (9/485) in patients with negative previous biopsy.

CONCLUSION

Prebiopsy 3-T mpMRI with cancer-negative findings misses approximately 12.5% PCa including 6% CSCs in a cohort of biopsy-naive patients and patients with negative previous biopsy.

CLINICAL RELEVANCE/APPLICATION

In a cohort of biopsy-naive patients or patients with negative previous biopsy, 3-T multiparametric MRI can improve the detection of clinically significant prostate cancers, which can help to select optimal treatment strategies.

RC207-09 Magnetic Resonance/Ultrasound (MR/US) Fusion Biopsy in Clinical Practice: Is Systematic Biopsy still Needed to Detect Clinically Significant Prostate Cancers?

Monday, Nov. 30 10:40AM - 10:50AM Location: N227

Participants
Andrei S. Purysko, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Leonardo K. Bittencourt, MD, PhD, Rio De Janeiro, Brazil (*Abstract Co-Author*) Nothing to Disclose
Antonio C. Westphalen, MD, Mill Valley, CA (*Abstract Co-Author*) Nothing to Disclose
Andrew J. Stephenson, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Erick M. Remer, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Brian R. Herts, MD, Cleveland, OH (*Abstract Co-Author*) Research Grant, Siemens AG
Erika Schneider, PhD, Cleveland, OH (*Abstract Co-Author*) Stockholder, General Electric Company Stockholder, Pfizer Inc Stockholder, NitroSci Pharmaceuticals, LLC
Jennifer Bullen, MSc, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Cristina Magi-Galluzzi, MD, PhD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Eric Klein, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare the detection rates of clinically significant (CS) prostate cancer (PCa), herein defined as a tumor with Gleason score >= 3 + 4, by MR/US fusion biopsy and systematic extended-sextant TRUS (S-TRUS) biopsy.

METHOD AND MATERIALS

IIRB-approved, HIPAA compliant retrospective study included 256 men (mean age: 62.3 yrs.) with either suspected PCa (n = 187) or enrolled on active surveillance (n = 69). All patients underwent multiparametric MRI (mpMRI) of the prostate on a 3.0 T magnet without endorectal coil as part of clinical care prior to biopsy, with T2, high B-value diffusion, and dynamic contrast enhancing imaging. Patients with potential tumor by mpMRI (n= 193) underwent MR/US fusion biopsy followed by 12-core systematic biopsy (SB) in the same procedure and performed by the same urologist who was aware of the location of the targets; those with negative mpMRI underwent SB only (n = 63). The results of both biopsy techniques alone and combined were evaluated.

RESULTS

The overall detection rate of PCa in this population was 51.2% (131/256), and CS PCa was detected in 26.6% (68/256) of the men. In those with positive mpMRI, there was no significant difference in the number of men with CS PCa detected by either biopsy technique (MR/US fusion biopsy: 46 men [23.8%]; SB: 48 men [24.9%]), and both techniques combined detected more men with CS PCA (66 men [34.2%]). CS PCa was detected exclusively by MR/US fusion biopsy in 18 men (9.3%), and by SB in 20 men (10.4%). In most men with CS PCa exclusively detected by SB, the sextants involved were the same (n = 14) or the immediately adjacent ipsilateral sextant (n = 3) where the MRI target was described; in only 3 men (1.5%) the targets were located in a distant sextant from the site involved by CS PCa. PCa was detected in 28.6% (18/63) of the men with negative mpMRI, but only 2 cases (3.2%) were CS PCa.

CONCLUSION

More CS PCa was detected when MR/US fusion biopsy was combined with SB, with greater contribution from biopsies of the same or immediately adjacent sextants of the MRI targets.

CLINICAL RELEVANCE/APPLICATION

In clinical practice, MR/US fusion biopsy should be performed in conjunction with systematic biopsy of the same and immediately adjacent sextants of MRI-targets to ensure the detection of CS PCa detected by mpMRI.

RC207-10 MR and MR-US Guided Biopsy

Monday, Nov. 30 10:50AM - 11:15AM Location: N227

Participants
Daniel J. Margolis, MD, Los Angeles, CA, (daniel.margolis@ucla.edu) (*Presenter*) Research Grant, Siemens AG

LEARNING OBJECTIVES

1) List the indications for in-bore MR-guided and MR/US fusion-guided prostate biopsy. 2) Optimize the protocol and image post-processing of prostate MRI for lesion detection, selection, and delineation. 3) Understand the differences between in-bore MR-guided and MR/US fusion-guided prostate biopsy. 4) Describe the advantages and disadvantages of the different kinds of MR/US fusion-guided prostate biopsy. 5) Communicate with referrers to ensure all information is processed correctly for the biopsy session.

ABSTRACT

Interest in, and growth of, prostate MRI has been largely driven by increasing use of this technology for lesion detection rather than treatment planning. This shift in focus is accompanied by changes in the MRI protocol, and how this information is used. A growing number of opportunities for targeted biopsy, both in-bore direct MRI-guided and MRI-ultrasound image fusion targeting, is accompanied by nearly as many different approaches. Each has advantages and disadvantages, some obvious, and some surprising. Awareness of these issues and how to master them is crucial for providing optimal patient care. These issues range from the hardware and software necessary to plan and perform the biopsy, to the intricacies of information and data communication, to referral and follow-up. A comprehensive, service-line approach ensures patients are followed appropriately at all stages of this process.

ABSTRACT

Multiparametric MRI has transformed from a tool primarily used for staging of known cancer into one for detection, localization, and sampling of suspected cancer. This has allowed for streamlining and simplifying the protocol use for imaging the prostate, which presents its own challenges, including managing decreased signal-to-noise ratios and interfacing with image-guided targeted biopsy software and hardware. The various platforms available for image-fusion targeted biopsy include in-bore MRI-directed, "cognitive-" or "mental-fusion" MRI-ultrasound targeted biopsy, software image fusion, articulated arm, and electromagnetic tracking. Attendees will learn how to incorporate image-guided targeted biopsy into their practice, how to interface with clinical collaborators and referrers, and how image-guided targeted biopsy improves confidence in managing men with suspected or known prostate cancer.

URL

http://1drv.ms/1kzFy7W

RC207-11 12 Months Follow-Up Results of MRI-Guided Transurethral Ultrasound Ablation for Treatment of Localized Prostate Cancer

Monday, Nov. 30 11:15AM - 11:25AM Location: N227

Participants
Maya B. Mueller-Wolf, MD, Heidelberg, Germany (*Presenter*) Nothing to Disclose
Sascha Pahernik, MD, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Boris Hadaschik, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Timur Kuru, MD, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Ionel V. Popeneciu, MD, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Gencay Hatiboglu, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Joseph Chin, MD, London, ON (*Abstract Co-Author*) Nothing to Disclose
Michele Billia, MD, London, ON (*Abstract Co-Author*) Nothing to Disclose
James D. Relle, MD, West Bloomfield, MI (*Abstract Co-Author*) Nothing to Disclose
Jason M. Hafron, MD, West Bloomfield, MI (*Abstract Co-Author*) Nothing to Disclose
Kiran R. Nandalur, MD, Northville, MI (*Abstract Co-Author*) Nothing to Disclose
Mathieu Burtnyk, DIPLPHYS, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Heinz-Peter Schlemmer, MD, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Matthias Roethke, MD, Heidelberg, Germany (*Abstract Co-Author*) Speaker, Siemens AG

PURPOSE

MRI-guided transurethral ultrasound ablation (MR-TULSA) is a novel minimally-invasive technology to treat organ-confined prostate cancer (PCa), aiming to provide local disease control with a low side-effect profile. Directional plane-wave high-intensity ultrasound generates a continuous volume of thermal coagulation to the prostate using real-time MR-thermometry control. A prospective, multi-institutional Phase I clinical study investigated safety, feasibility, and assessed efficacy of MR-TULSA treatment for PCa.

METHOD AND MATERIALS

30 patients with biopsy-proven, low-risk prostate cancer were enrolled: age>=65y, T1c/T2a, PSA<=10ng/ml, Gleason<=3+3 (3+4 in Canada only). Under general anaesthesia, the ultrasound device (TULSA-PRO, Profound Medical Inc., Canada) was positioned in the prostatic urethra with guidance from a 3T MRI (Siemens, Germany). Treatment planning was performed under MRI visualization with therapeutic intent of whole-gland ablation. Treatment was delivered under continuous MRI thermometry feedback control.

RESULTS

MR-TULSA was well-tolerated by all patients without intraoperative complications. Median (5th-9th percentile) treatment time and prostate volume were 36 (24-54) min and 44 (30-89) ml, respectively. Maximum temperature measured during treatment depicted a continuous region of heating shaped accurately to the prostate to within 0.1 ± 1.3 mm. CE-MRI confirmed the resulting conformal non-perfused volume, and correlated well with the ablative temperatures on MR-thermometry. Successful treatment was further indicated by a median PSA decrease from 5.8 (2.8-8.9) ng/ml to 0.8 (0.1-3.2) ng/ml after one month remaining stable at 0.8 (0.1-3.7) ng/ml to 12 month. MRI and biopsy findings at 12 month show diminutive prostate volumes, averaging 51% fibrosis (n=29). Positive biopsies (55% of patients) demonstrate 61% reduction in total cancer length.

CONCLUSION

MRI-guidance enables accurate treatment planning, real-time dosimetry and control of the thermal ablation volume. Primary outcomes show that MR-TULSA is safe and precise for prostate ablation. Phase I data are sufficiently compelling to study MR-TULSA in a larger efficacy trial.

CLINICAL RELEVANCE/APPLICATION

Whole-gland ablation can be safely and accurately achieved using MR-TULSA, which represents a minimally-invasive treatment option for organ-confined prostate cancer.

RC207-12 A Pilot Study to Evaluate Outpatient, Transrectal, Magnetic Resonance-guided Laser Focal Therapy for Treatment of Localized Prostate Cancer

Monday, Nov. 30 11:25AM - 11:35AM Location: N227

Participants
Bernadette M. Greenwood, BS, RT, Indian Wells, CA (*Abstract Co-Author*) Nothing to Disclose
John F. Feller, MD, Indian Wells, CA (*Presenter*) Consultant, Koninklijke Philips NV Consultant, Visualase, Inc
Stuart T. May Sr, MD, Indian Wells, CA (*Abstract Co-Author*) Nothing to Disclose
Roger McNichols, PhD, Houston, TX (*Abstract Co-Author*) Employee, BioTex, Inc
Wes Jones, Indian Wells, CA (*Abstract Co-Author*) Nothing to Disclose
Axel Winkel, DiplEng, Schwerin, Germany (*Abstract Co-Author*) Employee, Koninklijke Philips NV

PURPOSE

In the United States alone, new prostate cancer cases for 2014 were estimated at 233,000 and deaths at 29,480. Focal therapies for low risk and intermediate risk localized prostate cancer are increasingly being explored. Our objective is to investigate the safety and feasibility of using outpatient MR- (magnetic resonance) guided laser focal therapy for MR-visible prostate cancer utilizing a transrectal approach for laser applicator placement and therapy delivery.

METHOD AND MATERIALS

All MR-guided therapy was delivered using a 1.5T Philips Achieva XR system (Philips Healthcare, Best, The Netherlands) for both image acquisition and real-time thermometry. Follow-up multiparametric MRI's (mpMRI) were performed on the same scanner as were all follow-up MR-guided prostate biopsies. DynaCAD and DynaLOC (Invivo, Orlando, FL, USA) software were used for image analysis and interventional planning. Laser therapy was delivered using a Visualase (BioTex, Houston, TX, USA) 15W 980 nm laser applicator introduced transrectally using the DynaTRIM (Invivo, Orlando, FL, USA)

RESULTS

34 men were treated. 45 cancer foci were treated. Total procedure time was between 1.5 and 4 hours. MRI volume of coagulation necrosis ranged from 1.2-5.0cc. No serious adverse events or morbidity were reported. 7 treatment regions were positive at 6 month biopsy, consistent with residual/recurrent cancer (23% of subjects, 15% of treated regions). 4 regions were retreated with laser focal therapy. We observed a 35% decrease in mean PSA 1 year post-therapy and no statistically significant change is IPSS and SHIM scores at 6 months post-treatment. 4 patients went on to whole gland therapy: 3 incidence cancer patients (2 Gleason Score 4+4=8, 1 Gleason Score 4+3=7 multi-focal) elected radical prostatectomy (RP). No additional technical difficulty with dissection was reported by the surgeon performing RP. 1 Gleason 3+3=6 elected proton beam therapy (PBT) before undergoing 6 month follow-up and biopsy. Incidence cancer rate was 10%.

CONCLUSION

Our data indicate that outpatient transrectally delivered MR-guided laser focal therapy for localized prostate cancer is both safe and feasible.

CLINICAL RELEVANCE/APPLICATION

In the current climate of cost-reduction and emphasis on minimally-invasive treatment of cancer, focal treatment of prostace cancer with a precisely delivered energy source under MRI-guidance may have favorable results for cost control and quality of life.

RC207-13 Focal Therapies

Monday, Nov. 30 11:35AM - 12:00PM Location: N227

Participants
Aytekin Oto, MD, Chicago, IL, (oto@uchicago.edu) (*Presenter*) Research Grant, Koninklijke Philips NV; ; ;

LEARNING OBJECTIVES

1) Emerging paradigm of focal therapy for early stage low risk prostate cancer. 2) Current status of different focal therapy methods

including laser ablation, high intensity focused US, electroporation and cryotherapy. 3) Challenges in patient monitoring following focal therapy. 4) Future developments in focal therapy of prostate cancer and the importance of radiologist's involvement.

ABSTRACT

TITLE: Image guided focal therapy of prostate cancer Focal therapy of low risk early stage prostate cancer is increasingly important as a minimally invasive option for many patients. The rationale, patient selection criteria and challenges for image-guided focal prostate cancer therapy will be discussed. The essential technical details, advantages and disadvantages of clinically available focal therapy methods will be reviewed. Post-therapy patient monitoring options will be presented. Future developments in the area of focal therapy of prostate cancer and opportunities for involvement of radiologists in focal therapy will be explored.

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Aytekin Oto, MD - 2013 Honored Educator

RC208

Emergency Radiology Series: Emergency Radiology: Optimize Your Imaging

Monday, Nov. 30 8:30AM - 12:00PM Location: S102AB

CT ER

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

Participants
Meir H. Scheinfeld, MD, PhD, Bronx, NY, (mscheinf@montefiore.org) (*Moderator*) Nothing to Disclose
Aaron D. Sodickson, MD, PhD, Wayland, MA, (asodickson@bwh.harvard.edu) (*Moderator*) Research Grant, Siemens AG; Consultant, Bracco Group
Ferco H. Berger, MD, Amsterdam, Netherlands (*Moderator*) Nothing to Disclose

Sub-Events

RC208-01 Optimizing Pulmonary Embolism CT

Monday, Nov. 30 8:30AM - 8:55AM Location: S102AB

Participants
Aaron D. Sodickson, MD, PhD, Wayland, MA, (asodickson@bwh.harvard.edu) (*Presenter*) Research Grant, Siemens AG; Consultant, Bracco Group

LEARNING OBJECTIVES

1) Review the meaning of the X-ray tube output metrics CTDIvol and DLP. 2) Understand practical radiation dose reduction techniques including, among others, how tube current modulation works and is configured. 3) Demonstrate practical CT strategies to optimize CT parameters and IV contrast infusion to achieve excellent image quality at low radiation dose .

ABSTRACT

Honored Educators

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Aaron D. Sodickson, MD, PhD - 2014 Honored Educator

RC208-02 Expiratory Phase CT Pulmonary Angiography: Improving Contrast Enhancement of the Pulmonary Arteries in Failed Diagnostic Studies

Monday, Nov. 30 8:55AM - 9:05AM Location: S102AB

Participants
Joao R. Inacio, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Maha A. Al Dajani, MD, MBBS, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Katrina Newbigin, MBBS, Brisbane, Australia (*Abstract Co-Author*) Nothing to Disclose
Carolina A. Souza, MD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Ashish Gupta, MD, Ottawa, ON (*Abstract Co-Author*) Grant, Medtronic, Inc
Elena Pena, MD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Adnan M. Sheikh, MD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Matthew D. McInnes, MD, FRCPC, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Abstract Co-Author*) Research Grant, Toshiba Corporation;
Carole J. Dennie, MD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

CT pulmonary angiography (CTPA) is performed in end-inspiration. Non-diagnostic studies resulting from inadequate pulmonary arterial contrast opacification may be secondary to poor thoracic inflow of contrast and are routinely repeated in end-inspiration. We aimed to prospectively assess the benefit of performing the repeat study in end-expiration to obtain diagnostic studies.

METHOD AND MATERIALS

From November 2013 to April 2014, a prospective protocol was implemented to identify consecutive non-diagnostic CTPA studies due to poor pulmonary arterial contrast opacification in a tertiary center. All studies identified as non-diagnostic at the CT console by the technologist, were followed by a repeat contrast injection and image acquisition was performed in end-expiration. Measurement of pulmonary arterial attenuation and lung volumes was compared in all failed inspiration and repeated end-expiration studies (t test). A retrospective cohort of repeated CTPA studies performed in end-inspiration was compared with the prospective cohort.

RESULTS

Of 1700 consecutive CT pulmonary angiograms performed, 13 patients had a non-diagnostic inspiration study (<200HU attenuation in the MPA) and had a repeat end-expiration study. Expiratory phase CTPA studies had higher contrast enhancement in the MPA ($p<0.001$). Expiratory studies were diagnostic (MPA >200HU) in 92% of patients (12 of 13).

CONCLUSION

End-expiration CTPA studies demonstrate significant improvement in pulmonary arterial enhancement compared to failed inspiration

studies, allowing diagnostic salvage studies.

CLINICAL RELEVANCE/APPLICATION

End-expiration CTPA studies can be used to salvage non diagnostic CTPA inspiratory studies.

RC208-03 New Contrast Injection Protocol for Dual Energy Chest CT: Does it Obviate the Need for Bolus Tracking and Arbitrary Scan Delay?

Monday, Nov. 30 9:05AM - 9:15AM Location: S102AB

Participants
Alexi Otrakji, MD, Boston, MA (*Presenter*) Nothing to Disclose
Azadeh Tabari, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Shaunagh McDermott, FFR(RCSI), Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Jo-Anne O. Shepard, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Mannudeep K. Kalra, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Subba R. Digumarthy, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Efren J. Flores, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

CT pulmonary angiography (CTPA) is often triggered with bolus tracking (BT) techniques. We compared effects of bolus tracking and new fixed delay split bolus (FD-SB) contrast injection on vascular enhancement (pulmonary and aortic) and artifacts on dual energy CTPA.

METHOD AND MATERIALS

Of the 80 adult patients included in our study, 40 patients underwent CTPA using BT (4 cc/second, 370 mg%, 80-100 ml) (n= 20 patients with single energy CT(SECT): M:F 9:11,mean age 62± 11years, mean weight 75±15kg and n= 20 patients with dual energy CT(DECT) M:F 11:9, mean age 61± 15years, mean weight 76±13 kg) and 40 weight matched patients were scanned with FD-SB (M:F 21:19, mean age 62±10years, mean weight 73±16kg). In FD-SB (80ml, 370 mg%), 44ml of contrast was injected at rate of 0.6ml/second followed by 36ml contrast at rate of 1.8ml/second with DECT scanning at 100 second fixed delay. DECT was performed on dual source MDCT or single source 64-row MDCT. All exams were assessed subjectively for vascular enhancement (lobar, segmental and subsegmental pulmonary arteries, aorta, and left atrial appendage) and artifacts. HU in MPA, and CTDI vol and DLP were recorded.

RESULTS

There was no significant difference between patient weights in BT and FD-SB groups (p=0.6). CTDI vol for BT SECT: 14±6 mGy; and BT DECT:9±1.7mGy; and FD-SB DECT; 7±0.7mGy. For FD-SD DECT, mean HU in main pulmonary arteries was 353±132HU. Optimal to excellent qualitative contrast enhancement up to subsegmental levels was seen for both BT and FD-SB examinations in 97.5% of cases (39/40) and limited in one patient (2.5%, 1/40). FD-SB DECT resulted in significantly superior enhancement in left atrium and thoracic aorta in all patients compared to all BT (SECT and DECT) ($p<0.05$). Contrast streak artifacts were also substantially lower on FD-SB DECT than on BT exams. Pulmonary blood volume images were uniform and superior on FD-SB DECT than on BT DECT.

CONCLUSION

Fixed delay split bolus contrast injection with DECT results in better contrast enhancement in pulmonary arteries, heart, and aorta with less contrast related artifacts as compared to bolus tracking technique for single energy- or DE-CT pulmonary angiography.

CLINICAL RELEVANCE/APPLICATION

Fixed delay split bolus DECT of the chest has the potential to replace bolus tracking CTPA for the evaluation of chest vasculature.

Honored Educators

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Subba R. Digumarthy, MD - 2013 Honored Educator

RC208-04 Dual-energy CT in the Emergency Department

Monday, Nov. 30 9:15AM - 9:40AM Location: S102AB

Participants
Savvas Nicolaou, MD, Vancouver, BC (*Presenter*) Institutional research agreement, Siemens AG

LEARNING OBJECTIVES

1) Review the basic principles of dual energy CT/Spectral imaging. 2) Discuss novel techniques implemented using dual energy CT in the acute setting including: material characterization/decomposition, bone subtraction, virtual non-contrast, iodine distribution maps, and monoenergetic spectral imaging. 3) To explain the utility of dual energy/spectral imaging in the acute care setting with examples in cardiopulmonary imaging, vascular imaging, intracranial aneurysms and stroke imaging, blunt vascular neck injuries, abdominal imaging and musculoskeletal applications.

ABSTRACT

RC208-05 Is Dual-Energy CT Pulmonary Angiography (CTPA) a Viable Alternative to Single-energy CTPA in Pregnant and Post-partum Patients? Initial Results

Monday, Nov. 30 9:40AM - 9:50AM Location: S102AB

Participants
Shaunagh McDermott, FFR(RCSI), Boston, MA (*Presenter*) Nothing to Disclose
Efren J. Flores, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Alexi Otrakji, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Subba R. Digumarthy, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Kalra K. Mannudeep, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Jo-Anne O. Shepard, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare single-energy (SE) and dual-energy (DE) CT pulmonary angiogram (CTPA) protocols in pregnant and postpartum women.

METHOD AND MATERIALS

Our IRB approved study included 64 patients. Fifty patients underwent CTPA to assess for pulmonary embolism with either DE-CTPA (mean age 34 years, range 27-45; mean weight 106+49kg; mean gestation 21.5 weeks; mean postpartum 11 days) or SE-CTPA (mean age 30 years, range 19-44; mean weight 92+45kg; mean gestation 26 weeks; mean postpartum 9 days). Fourteen weight-matched non-pregnant women underwent DE-CTPA (mean age 33 years, range 22-44; mean weight 93+33kg). Scans were performed on single and dual source DECT capable CT scanners. Images were assessed qualitatively for image quality, contrast enhancement (up to subsegmental pulmonary arteries) and artifacts. CT numbers were measured in the pulmonary trunk, right and left main and lower lobar arteries. Noise was also measured in the pulmonary trunk. CTDIvol and DLP were also recorded.

RESULTS

A third (32%) of pregnant/postpartum women had limited or unacceptable SE-CTPA studies compared to just 14% limited or unacceptable DE-CTPA studies (identical to non-pregnant group undergoing DE-CTPA). Limited or unacceptable DE-CTPA occurred only in heavier patients (>190 kg) from excess noise due to application of incorrect scan parameters in these patients (80/140 kV instead of correct higher dose setting of 100/140 kV). Suboptimal SE-CTPA was noted in patients of all sizes (61-139 kg). Mean HU values of the pulmonary trunk were 588+373 HU in the DE-CTPA pregnant/postpartum group, 245+72 HU in the SE-CTPA pregnant/postpartum group ($p<0.05$). DE-CTPA in the pregnant/postpartum group was optimal for evaluation of subsegmental pulmonary arteries in 64% of patients relative to only 37% patients in the SE-CTPA group. Frequency of contrast streak artifacts on DE- and SE-CTPA was similar ($p>0.05$). The CTDIvol for DE-CTPA and SE-CTPA were 9 and 19 mGy, respectively (<0.05).

CONCLUSION

DE CTPA provides better contrast enhancement and fewer suboptimal studies compared to SE CTPA for evaluation of pulmonary embolism in pregnant or postpartum women.

CLINICAL RELEVANCE/APPLICATION

Pulmonary embolism is an important cause of morbidity and mortality in pregnant and postpartum women. DE CTPA produces better quality images when compared to SE CTPA with equal or reduced radiation in this group. Therefore, it is logical to utilize this modality whenever available.

Honored Educators

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Subba R. Digumarthy, MD - 2013 Honored Educator

RC208-06 Improved Signal and Image Quality at the Cervicothoracic Junction Using Dual-Energy CT and Monoenergetic Plus Reconstruction

Monday, Nov. 30 9:50AM - 10:00AM Location: S102AB

Participants
Dennis Parhar, BSc, Vancouver, BC (*Presenter*) Nothing to Disclose
Teresa I. Liang, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Luck J. Louis, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Tim O'Connell, MD, Meng, Vancouver, BC (*Abstract Co-Author*) President, Resolve Radiologic Ltd; Speake, Siemens AG
Patrick D. McLaughlin, FFRRCSI, Cork, Ireland (*Abstract Co-Author*) Speaker, Siemens AG
Savvas Nicolaou, MD, Vancouver, BC (*Abstract Co-Author*) Institutional research agreement, Siemens AG

PURPOSE

Attempts to reduce radiation exposure at the cervical spine are frequently and negatively limited by beam hardening artifact and photon starvation at the cervicothoracic junction. The purpose of this study is to examine whether dual-energy CT (DECT) with advanced monoenergetic (Mono+) reconstruction can reduce these artifacts and improve image quality through the cervicothoracic junction.

METHOD AND MATERIALS

In this retrospective study, 19 consecutive patients underwent DECT scanning of the cervical spine using a dual source 128-slice CT scanner (Definition FLASH, Siemens Healthcare, Germany) between February 1 and March 31, 2015. The DECT data was reconstructed using the Mono+ algorithm at five different energy levels (ranging 100 to 190 keV). Attenuation was measured at each energy level by placing regions of interest within the vertebral bodies and spinal cord. Statistical analysis of the objective data was carried out by student's t-test. Subjective analysis of image quality was conducted on a semi-objective 4 point scoring scheme by 4 radiologists. These results were subjected to a Wilcoxon Signed-Rank Test for statistical analysis.

RESULTS

Attenuation of the spinal cord at the level of C7 to T1 was significantly reduced as compared to C2 due to beam hardening. In the

Attenuation of the spinal cord at the level of C7 to T1 was significantly reduced as compared to C2 due to beam hardening. In the 100 keV reconstruction, there was a 69.9% decrease (-27.7HU, p<0.0001) in attenuation at C7 and 60.2% (-23.9HU, p<0.0001) at T1 compared to C2. However, cord attenuation substantially improved with increased energy. The maximal improvement was seen with Mono+ images reconstructed at 190 keV, where cord attenuation at C7 resulted in an increase of 61.0% (7.28HU, p=0.0391) over 100keV. Subjective analysis also revealed improved image quality at the cervicothoracic junction. Compared to the mixed energy scans, at 190keV, there was a significant improvement in the quality of spinal cord visualization at C7 (median =3.0, p<0.0001) and at T1 (median=3.000, p<0.0001). Beam hardening artifacts were also reduced by 44.8% (p<0.0001) at the C7-T1 junction.

CONCLUSION

Data derived from DECT and reconstructed using the Mono+ algorithm significantly reduces beam hardening artifacts at the cervicothoracic junction and significantly improves image quality.

CLINICAL RELEVANCE/APPLICATION

CT imaging at the cervicothoracic junction suffers from extensive artifact and noise. Due to its superior image quality, Mono+ can provide a significant benefit by improving assessment of this region.

RC208-07 Question and Answer

Monday, Nov. 30 10:00AM - 10:15AM Location: S102AB

Participants

RC208-08 Optimizing Abdominal CT Protocols and Utilization

Monday, Nov. 30 10:15AM - 10:40AM Location: S102AB

Participants
Aaron D. Sodickson, MD, PhD, Wayland, MA (*Presenter*) Research Grant, Siemens AG; Consultant, Bracco Group

LEARNING OBJECTIVES

1) To overview the current status of emergency abdominal and pelvic CT imaging protocols. 2) To review the current literature of abdominal and pelvic emergency CT imaging protocols, with an emphasis on optimizing diagnostic information while minimizing radiation dose reduction. 3) To review areas of continuing controversy regarding emergency abdominal CT protocols.

RC208-09 Noncalcified Gallstones: Making the Invisible Visible with Dual Energy CT

Monday, Nov. 30 10:40AM - 10:50AM Location: S102AB

Participants
Jennifer W. Uyeda, MD, Boston, MA (*Presenter*) Nothing to Disclose
Aaron D. Sodickson, MD, PhD, Wayland, MA (*Abstract Co-Author*) Research Grant, Siemens AG; Consultant, Bracco Group

PURPOSE

To assess whether virtual monochromatic imaging (VMI) increases the detection of noncalcified gallstones on dual-energy CT (DECT) compared with conventional polychromatic scanning.

METHOD AND MATERIALS

25 patients (20F, 5M) with noncalcified gallstones confirmed on abdominal ultrasound and/or MR were included in this IRB approved, HIPAA compliant study. All patients had a DECT on a dual-source 128x2 slice scanner (Siemens FLASH) with either 80/Sn140 or 100/Sn140 kVp pairs depending on patient size. 0.75x0.5 mm source images at high and low kVp were used for DE postprocessing (Syngo via, version VA30) using the Monoenergetic Plus application. Within 3 mm reconstructed slices, regions of interest of 0.5 cm2 were placed on noncalcified gallstones and bile to record Hounsfield Units (HU) at VMI energy levels ranging from 40-190 keV.

RESULTS

Noncalcified gallstones uniformly demonstrate HU that are lowest at 40 keV and increase at higher keV. Bile HU values generally decrease at higher keV. Few of the noncalcified stones are visible at 70 keV (simulating a conventional 120 kVp scan), with measured contrast (bile-stone HU) <10 HU in 76%, 10-20 in 20%, and >20 in 4%. Contrast is maximal at 40 keV, where 100% demonstrate >20 HU difference, 75% > 38 HU difference, and 50% > 55 HU difference. A paired t-test demonstrates a significant difference (p<0.0001) between this stone:bile contrast at 40 keV vs 70 keV.

CONCLUSION

Low VMI energy of 40 keV increases conspicuity of noncalcified gallstones compared to conventional 120 kVp polychromatic scanning, potentially improving detection.

CLINICAL RELEVANCE/APPLICATION

DECT optimizes visualization of noncalcified gallstones, many of which are invisible on conventional 120kVp scans. This may reduce the need for further imaging for suspected cholelithiasis.

Honored Educators

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Aaron D. Sodickson, MD, PhD - 2014 Honored Educator

RC208-10 Comparison of Abdominal Radiograph and Non-contrast Ultralow Dose CT for Kidney Stones

(CANUCKS Study)

Monday, Nov. 30 10:50AM - 11:00AM Location: S102AB

Participants
Patrick D. McLaughlin, FFRRCSI, Cork, Ireland (*Presenter*) Speaker, Siemens AG
Ben Chew, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Jean Buckley, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
James Nugent, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
John R. Mayo, MD, Vancouver, BC (*Abstract Co-Author*) Speaker, Siemens AG
Luck J. Louis, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Hugue A. Ouellette, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Savvas Nicolaou, MD, Vancouver, BC (*Abstract Co-Author*) Institutional research agreement, Siemens AG
Charles V. Zwirewich, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

At our institution, Kidney-Ureter-Bladder (KUB) radiographs are routinely performed immediately prior to shockwave lithotripsy (SWL). Conventional low dose CT-KUBs (2.2-3.0 mSv) are only performed if stones are not visible on KUB (10-15% of cases). Recent advances in integrated circuit CT detector design (STELLAR, Siemens Healthcare) and image reconstruction algorithms have made sub-milliSievert ultra-low dose CT (ULDCT) acquisition feasible, but the diagnostic performance of these ULDCTs in comparison with KUB has not yet been reported. In this prospective study we compare the radiation dose and diagnostic performance of ULDCT to KUB in patients prior to SWL. We hypothesized that ULDCT will detect more symptomatic calculi than KUB at less radiation exposure prior to SWL.

METHOD AND MATERIALS

Patients enrolled in this study consented and received both a KUB radiograph and an ULDCT (32x0.6mm,100kV, refmAs=10,pitch 1.5) prior to SWL. If no stones were identified, then a standard low dose abdominal CT was obtained. Radiation exposure parameters were recorded and both examinations were read in random order by 2 blinded radiologists to determine image quality and diagnostic accuracy.

RESULTS

102 patients (M:F, 72:32) with a mean age of 55.7 ± 13.8y were enrolled. The effective radiation dose was 48% lower with ULDCT (0.28±0.08 mSv) compared to KUB (0.54±0.11 mSv, p<0.001). Mean CTDIvol and DLP of ULDCT were 0.47±0.26mGy and 20±12mGy.cm respectively. The number of stones seen on both modalities was equivalent: KUB was 1.59±1.27 vs 1.92±01.51 for ULDCT (p=0.35). However in 12 cases (12%), the ULDCT helped localize ureteral stones that were not detected on KUB. Measurement of stone size was equivalent using ULDCT (6.47±3.34mm) compared to KUB (6.98±3.41mm, p=0.455). ULDCT reduced the requirement for repeat conventional dose CTKUB and altered treatment priority of treating the ureteral stones first.

CONCLUSION

ULDCT delivers 48% less radiation than a KUB radiograph and was equivalent in detecting the number and size of stones. In 12% of cases, ULDCT identified and localized ureteric stones prior to SWL that were not seen on KUB.

CLINICAL RELEVANCE/APPLICATION

This prospective single centre study demonstrates that ULDCT is suiteable to replace KUB as it delivers 48% less radiation, more frequently detects ureteric calculi and reduces the requirement for repeat conventional dose CTKUB prior to SWL.

RC208-11 Optimizing Emergency Musculoskeletal MRI

Monday, Nov. 30 11:00AM - 11:25AM Location: S102AB

Participants
Joseph S. Yu, MD, Columbus, OH, (joseph.yu@osumc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand when to use MRI in urgent and emergent MSK conditions. 2) To optimize the types and number of sequences for urgent studies. 3) To review the use of IV gadolinium in the emergent situation.

RC208-12 Utility of a Virtual Non-contrast Dual Energy CT Algorithm for Detection of Bone Marrow Edema in Non-displaced Hip Fractures

Monday, Nov. 30 11:25AM - 11:35AM Location: S102AB

Participants
Trenton T. Kellock, MD, Vancouver, BC (*Presenter*) Nothing to Disclose
Sandra Kim, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Patrick D. McLaughlin, FFRRCSI, Cork, Ireland (*Abstract Co-Author*) Speaker, Siemens AG
Savvas Nicolaou, MD, Vancouver, BC (*Abstract Co-Author*) Institutional research agreement, Siemens AG
Paul I. Mallinson, MBChB, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Tim O'Connell, MD, Meng, Vancouver, BC (*Abstract Co-Author*) President, Resolve Radiologic Ltd; Speake, Siemens AG
Hugue A. Ouellette, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Hip fractures are associated with high disability, health care costs and mortality. The purpose of this study is to describe our experience with a dual energy CT (DECT) virtual non contrast (VNC) algorithm for detection of bone marrow (BM) edema in patients presenting to the emergency department with suspected non-displaced traumatic hip fractures.

METHOD AND MATERIALS

77 patients were identified that presented to a level one trauma center emergency department between Jan 1, 2014 and June 30,

2014, and received CT imaging due to clinical suspicion of a traumatic hip fracture. 66 underwent DECT of the hip or pelvis. Those with hip prosthesis (N=7) were excluded. Those with displaced hip fractures (N=9) were also excluded as they are not a diagnostic challenge on CT. VNC images were generated using prototype software. These were read in isolation, and then compared to standard bone reconstructions, by a staff radiologist. Both VNC and standard bone reconstruction images were graded for interpretation confidence (1-10 scale). Radiological and/or clinical diagnosis of fracture at 30-day follow up was used as the reference standard.

RESULTS

Of the 50 included patients, 8 were positive for VNC BM edema. All of these were true positives (Sn = 100%). Mean interpreter confidence of VNC images was 8.4 (range 4-10). On standard bone reconstructions, 7 of these true positives were recognized as fractures (Sn = 88%), with a mean interpreter confidence of 9.6 (range 6-10). 42 studies were negative for VNC BM edema, and all were true negatives (Sp = 100%). These were also all described as negative on the CT bone reconstructions (Sp=100%). Mean interpreter confidence was 8.3 (range 3-10) for VNC images, and 9.7 (range 6-10) for standard bone reconstructions.

CONCLUSION

Our study demonstrates that DECT VNC algorithm is an effective tool to supplement standard bone reconstructions in non-displaced traumatic hip fractures. Fractures that were subtle (or in one case not visible) on bone reconstructions all demonstrated BM edema, most with a high level of interpreter confidence. While our study is limited by a small sample size, current results suggest that DECT VNC algorithm is both highly sensitive and specific for identifying BM edema in non-displaced hip fractures.

CLINICAL RELEVANCE/APPLICATION

DECT VNC algorithm is an effective tool to supplement the interpretation of standard CT bone reconstructions in non-displaced traumatic hip fractures.

RC208-13 Dual-Energy CT for Analysis of Bone Marrow Edema in Acute and Chronic Carpal Bone Fractures

Monday, Nov. 30 11:35AM - 11:45AM Location: S102AB

Participants
Teresa I. Liang, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Ismail T. Ali, MBChB, MD, Vancouver, BC (*Presenter*) Nothing to Disclose
Memoona Mian, MD, FRCR, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Savvas Nicolaou, MD, Vancouver, BC (*Abstract Co-Author*) Institutional research agreement, Siemens AG

PURPOSE

Carpal bone fracture identification is often a challenging diagnosis, commonly underestimated on radiographs. CT helps to identify subtle fractures that may be radiographically occult. With the implementation of Dual Energy CT (DECT), the virtual non-calcium subtraction (VNC) technique can be applied to remove calcium to evaluate for bone marrow edema in fractures. In this study, we evaluate the utility of DECT VNC for assessment of bone marrow edema in patients with acute and chronic carpal bone fractures.

METHOD AND MATERIALS

The images of forty-seven patients between September 3, 2014 and March 9, 2015 with the suspicion of carpal bone fractures who underwent a DECT scan of their hand and wrist were reviewed by two readers using the VNC algorithm to determine the visual presence and absence of bone marrow edema in each carpal bone. The mean and standard deviation of the CT values within each carpal bone were recorded. Chi squared test and receiver operating characteristic (ROC) curve were used for statistical analysis, and $p<0.05$ was considered significant.

RESULTS

In the 47 patients, 376 carpal bones were reviewed. 24 patients had acute (DECT-A), and 23 patients had chronic (DECT-C) carpal bone fractures. Visual analysis demonstrated that significantly more patients in DECT-A group had bone marrow edema (BME) (20/24, 83.3%) than the DECT-C group (3/23, 13.0%, $p<0.0001$). The average CT values of the BME on the VNC images in the DECT-A and DECT-C groups were 61.6±26.3HU and 39.6±26.3HU respectively, whereas, in the non-BME carpal bones in the DECT-A and DECT-C groups, they measured -34.3±27.5HU and -24.9±13.0HU respectively. CT numbers for diagnosis of BME associated with acute carpal fractures revealed the area under the ROC curve of 0.993. An ideal cut-off value of 15.4HU for detection of BME associated with acute carpal fractures results in 100% sensitivity, 98.3% specificity, and 99.3% accuracy.

CONCLUSION

VNC DECT allows accurate visual assessment of bone marrow edema in acute carpal bone fractures. Using a cut-off of 15.4 HU provides a valid and reliable tool for detection of BME related to acute carpal bone fractures.

CLINICAL RELEVANCE/APPLICATION

Visual assessment of bone marrow edema and a quantitative cut-off of 15.4HU on VNC DECT images is useful for accurate and reliable identification of acute carpal bone fractures.

RC208-14 Question and Answer

Monday, Nov. 30 11:45AM - 12:00PM Location: S102AB

Participants

RC209

Gastrointestinal Series: Imaging Pancreatic Diseases

Monday, Nov. 30 8:30AM - 12:00PM Location: E351

GI

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Eric P. Tamm, MD, Houston, TX (*Moderator*) Nothing to Disclose
Onofrio A. Catalano, MD, Napoli, Italy (*Moderator*) Nothing to Disclose
Mahmoud M. Al-Hawary, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

RC209-01 Cutting-Edge Imaging on the Pancreas

Monday, Nov. 30 8:30AM - 8:55AM Location: E351

Participants
Riccardo Manfredi, MD, Verona, Italy (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To illustrate the role of contrast enhanced sonography and then Ultrasound elastrogrpahy in pancreatic imaging The role and utility of dual energy CT examination in pancreatic CT and the clinical utility of low voltage CT examination in detecting pancreatic focal lesions. 2) To illustrate the role of diffusion weighted imaging in detecting small pancreatic neuroendocrine neoplasms, especially in functioning neuroendocrine neoplasms. 3) To show the pancreatic response to secretin stimulation; the pancreatic duct changes following secretin stimulation. 4) To illustrate how to diagnose pancreatic outflow obstruction sue to Sphincter of Oddi dysfunction.

ABSTRACT

New pancreatic diagnostic imaging technique are represented by contrast enhanced ultrasound (US), US Elastography, dual energy computed tomography (CT), perfusion CT, diffusion weighted Magnetic Resonance (MR) imaging , and secretin enhanced magnetic resonance cholangiopancreatography (S-MRCP).The role of contrast enhanced ultrasound (CEUS) in pancreatic sonography will be illustrated in and its role in staging pancreatic adenocarcinoma. Ultrasound elastography is an emerging technique that is able to assess the stiffness of pancreatic parenchyma and might be helpful in diagnosis and staging chronic pancreatitis and in the differential diagnosis of focal pancreatic lesions.Dual energy CT might be useful in increasing the contrast resolution of pancreatic adenocarcinoma, and namely in diagnosing isovascular and/or small pancreatic adenocarcinomas, eventually responsible of main pancreatic duct stenosis.Diffusion weighted MR imaging is helpful in diagnosing focal pancreatic neoplasms and autoimmune pancreatitis. Its role in the abovementioned clinical settings will be discusses. MRCP is able to non-invasively assess pancreatic duct system. However in the assessment of pancreatic duct system MRCP has limitation due to the small size of the ducts. Secretin is able to improve the pancreatic duct system visualization at MRCP and at the same time is able to give functional information, since is able to physiologically stimulate the exocrine pancreas. The indication to S-MRCP and the S-MRCP signs in different pancreatic diseases will be illustrated.

Handout:Riccardo Manfredi

http://abstract.rsna.org/uploads/2015/15001859/Cutting edge pancreatic imaging Handouts.ppt

RC209-02 Pancreatic Mass Evaluation with Portal Venous Phase Single Energy (SE) and Dual-Energy CT (DECT)

Monday, Nov. 30 8:55AM - 9:05AM Location: E351

Participants
Andrea Prochowski Iamurri, MD, Boston, MA (*Presenter*) Nothing to Disclose
Manuel Patino, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Diana Murcia, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Yasir Andrabi, MD, MPH, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Rodrigo Canellas, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Farhad Mehrkhani, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Avinash R. Kambadakone, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Dushyant V. Sahani, MD, Boston, MA (*Abstract Co-Author*) Research Grant, General Electric Company; Research Consultant, Allena Pharmaceuticals, Inc

PURPOSE

Pancreatic mass evaluation with CT often dictates multi-phase acquisition and focused CM injection protocols for optimal detection and staging. Our objective was to investigate if the gain in the CNR from material density iodine images from ssDECT in portal venous phase is sufficient for pancreatic mass evaluation.

METHOD AND MATERIALS

In the IRB approved analysis, 143 patients with pancreatic masses and 10 controls (CC) were included; 100 with pancreatic ductal adenocarcinoma (PDAC), 16 with neuroendocrine tumors (pNET), 7 malignant cystic lesions (mCL), 5 metastasis (MTx), 5 focal pancreatitis (AP) and 10 splenules (SPL) . Portal-phase ssDECT (GE) of the abdomen was performed. 140 kV single energy (SE) and material decomposition iodine images (MD-I) images were reviewed by two blinded readers for lesion detection, size, diagnosis, stage using a 5-point confidence scale. ROIs were placed in the aorta and lesions for estimating mean iodine concentration (MIC)

and normalized iodine concentrations (NIC). Surgical findings in 128 cases and EUS/FNA and or FU in 15 cases served as a reference standard.

RESULTS

All 153 portal-phase DECT exams were rated of diagnostic quality and sufficient for rendering interpretation in 151/153 (98.7%) with high overall confidence (R1 4.4 and R2 4.5). The SECT images were considered adequate in 138/153 (90.1%) exams with low overall diagnostic score and confidence (R1 3.8 and R2 3.5) ($p<0.001$, $p<0.001$). 4 pNET, 6 PDAC and 2 solid masses in mCL were not reliably recognized on SECT but detected on DECT ($p<0.05$). 14/143 (9.8%) lesions measured < 2cm in diameter and 11/14 (78.6%) were confidently detected on the MD-I in comparison to 6/14 (42.9%) detected on SECT ($p>0.005$). In PDAC group, 6 patients were incorrectly down staged on SECT. Agreement between readers resulted almost perfect ($\kappa = 0.81$-1). The mean NIC were for PDAC 0.35±0.1, pNET 0.71±0.1, mCL 0.32±0.01, MTx 0.37±0.2, AP 0.55±0.3, SPL 0.66±0.1 and CC 0.50±0.1.

CONCLUSION

ssDECT enables more confident evaluation of pancreatic masses including small lesions and staging over SECT in a single portal phase acquisition. Quantitative analysis showed differences of iodine distribution in each type of lesion.

CLINICAL RELEVANCE/APPLICATION

These results lend opportunity to simplify pancreas CT protocol for easier workflow and lower radiation dose without negatively impacting the diagnostic performance.

Honored Educators

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Dushyant V. Sahani, MD - 2012 Honored Educator
Dushyant V. Sahani, MD - 2015 Honored Educator

RC209-03 Detection of Small Neuroendocrine Tumors by Pancreatic 3T MRI in Patients with Endogenous Hyperinsulinemic Hypoglycemia: A Prospective Study in Comparison to Glucagon-like Peptide-1 Receptor Imaging

Monday, Nov. 30 9:05AM - 9:15AM Location: E351

Participants
Kwadwo Antwi, Basel, Switzerland (*Presenter*) Nothing to Disclose
Daniel Boll, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Christoph J. Zech, MD, Basel, Switzerland (*Abstract Co-Author*) Research Grant, Bayer AG Speaker, Bayer AG Travel support, Bayer AG Advisory Board, Bayer AG Speaker, Bracco Group Travel support, Bracco Group
Elmar M. Merkle, MD, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Damian Wild, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Tobias Heye, MD, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Emanuel Christ, Bern, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Melpomeni Fani, PhD, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Guillaume Nicolas, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate pancreatic 3T MRI in the detection of small neuroendocrine tumors in comparison to Glucagon-like Peptide-1 receptor (GLP1-R) imaging by 68Ga-DOTA Exendin-4 Positron emission computed tomography (PET/CT) and/or surgery.

METHOD AND MATERIALS

This is an IRB approved, HIPAA compliant prospective study. In this interim analysis (32 patients planned) 18 consecutive patients with endogenous hyperinsulinemic hypoglycemia highly suspicious for an insulinoma and 2 healthy controls (13 female; 7 male; mean 56 yrs; range 18-80 yrs.) were included. Patients first underwent pancreatic MR imaging using a 3T MRI scanner (Magnetom Prisma, Siemens Healthcare) including T1w, T2w, diffusion weighted imaging (DWI) and dynamic contrast enhanced (DCE) sequences. PET/CT (Discovery STE, GE Healthcare) 2.5h after intravenous administration of 68Ga-DOTA Exendin-4 (all patients) and surgery in 14 patients served as reference standard. Three expert readers with >10 years of experience in abdominal radiology analyzed MRI in a blinded fashion. Presence and size of lesions were determined by 2 different readers in consensus using MRI and PET/CT results.

RESULTS

A total of 23 lesions were identified (mean size 12mm; range 3-25mm) by PET/CT. The overall MRI sensitivity and specificity was 82.1% and 44.4%, respectively (reader A: 69.6%; 60.0%; reader B: 81.8%, 33.3%; reader C: 95.5%: 42.9%). Signal characteristics of detected lesions were as follows: GRE 3D T1wo FS 100% hypointense; TSE T2w 85.7% hyperintense; 14.3% hypointense; high b-value DWI hyperintense 90.9%; 9.1% hypointense; DCE: 67.4% early hyperenhancing, 30.4% late hyperenhancing, 2.2% hypoenhancing. Consensus reading in correlation with PET/CT data showed all 23 lesions are discernible on MRI.

CONCLUSION

Focused pancreatic MRI is able to visualize small lesions in patients with suspected insulinomas with a sufficient detection rate. Although most lesions revealed typical reported signal characteristics few showed a different pattern which may explain failed detection. While MRI is not specific in lesion characterization it offers precise lesion localization when combined with a specific method such as Glucagon-like Peptide-1 receptor imaging.

CLINICAL RELEVANCE/APPLICATION

The combination of 3T MRI and GLP1-R PET/CT changed clinical management in 14 of 18 patients in which previous diagnostic procedures were not able to localize any lesion.

RC209-04 Pancreas Cancer

Monday, Nov. 30 9:15AM - 9:40AM Location: E351

Participants
Eric P. Tamm, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the current status of staging pancreatic cancer, the impact of cross-sectional imaging on staging, and understand the category of 'borderline resectable pancreatic cancer.' 2) Appreciate the impact of advances in vascular reconstruction surgery on staging and surgical planning. 3) Have a basic understanding of neoadjuvant therapy, and its impact on staging.

ABSTRACT

Because of recent advances in surgical trechnique and preoperative therapy, it has become useful for clinicians to group pancreatic cancer into categories useful for clinical trials and treatment management. Besides the clearly resectable, and clearly unresectable tumors, there has emerged the category of 'borderline' resectable pancreatic cancer. Classifying patients into these three categories is dependent on precise descriptions of the extent of tumor, particularly vascular involvement, as seen on cross sectional imaging. These descriptions also depend on the use of commonly understood terminology. Understanding and appreciating new surgical techniques, advances in preoperative therapy and how this has impacted margin positivity, and therefore why it is important to describe accurately and clearly tumor involvement and how best to do that will be the focus of this lecture.

RC209-05 Diffusion-weighted MRI of the Pancreas: Optimizing b-Value for Visualization of Pancreatic Adenocarcinoma

Monday, Nov. 30 9:40AM - 9:50AM Location: E351

Participants
Yoshihiko Fukukura, MD, PhD, Kagoshima, Japan (*Presenter*) Nothing to Disclose
Toshikazu Shindo, Kagoshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroto Hakamada, Kagoshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Koji Takumi, Kagoshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Yuichi Kumagae, Kagoshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Aya Umanodan, Kagoshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Junichi Ideue, Kagoshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Masanori Nakajo, MD, Kagoshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Kiyohisa Kamimura, MD, PhD, Kagoshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Takashi Yoshiura, MD, PhD, Kagoshima, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine the optimal b-value of DWI for visualizing pancreatic adenocarcinomas.

METHOD AND MATERIALS

Fifty-five patients with histologically confirmed pancreatic adenocarcinoma underwent DWI with different b-values (b=500, 1000, 1500, and 2000 s/mm²). We evaluated DWI findings of tumors using 3-point visual scoring (type 1, clearly demarcated hyperintensity; type 2, hyperintensity with an unclear distal border; and type 3, isointensity), and measured signal intensity (SI) of the tumor and proximal or distal pancreatic parenchyma. Visual scores and SI ratios of the tumor to pancreatic parenchyma were compared between b-values of 500, 1000, 1500, and 2000 s/mm². In types 2 and 3 tumors on DWI with b-value of 1000 s/mm², serum amylase levels were compared between type 1 and types 2-3 tumors on DWI with b-value of 1500 s/mm².

RESULTS

Type 1 tumors were seen in 17 (30.9%), 28 (50.9%), 42 (76.4%), and 44 patients (80.0%) on DWI with b-values of 500, 1000, 1500, and 2000 s/mm², respectively. There was a higher incidence of type 1 tumors on DWI with b-value of 1500 s/mm² than on that with b-value of 1000 s/mm² (P<.001), and on DWI with b-value of 1000 s/mm² than on that with b-value of 500 s/mm² (P<.001). There was no significant difference in the tumor to proximal pancreas SI ratio among the four b-values (P<.467). The tumor to distal pancreas SI ratio was higher with b-value of 1500 s/mm² than with b-value of 1000 s/mm² (P<.001), and with b-value of 1000 s/mm² than with b-value of 500 s/mm2 (P<.001). Between b-values of 1500 and 2000 s/mm², there was no significant difference in the incidence of type 1 tumors (P=.083) or the tumor to distal pancreas SI ratio (P=.870). In types 2-3 tumors on DWI with b-value of 1000 s/mm², a lower frequency of abnormal serum amylase elevation was observed in patients whose SI types were changed to type 1 at b-value of 1500 s/mm² than in those whose SI types were not changed (P<.018).

CLINICAL RELEVANCE/APPLICATION

The use of b-values>=1500 s/mm² can improve the delineation of pancreatic adenocarcinomas without tumor-associated acute pancreatitis on DWI.

RC209-06 CT after Neoadjuvant FOLFIRINOX Chemotherapy for Borderline and Locally Advanced Pancreatic Adenocarcinoma

Monday, Nov. 30 9:50AM - 10:00AM Location: E351

Participants
Mathilde Wagner, MD,PhD, Paris, France (*Presenter*) Nothing to Disclose
Celia Margarida S. Antunes, Coimbra, Portugal (*Abstract Co-Author*) Nothing to Disclose
Daniel Pietrasz, Creteil, France (*Abstract Co-Author*) Nothing to Disclose
Christophe Cassinotto, MD, Pessac, France (*Abstract Co-Author*) Nothing to Disclose
Magaly Zappa, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Antonio Sa Cunha, Villejuif, France (*Abstract Co-Author*) Nothing to Disclose
Jean-Baptiste Bachet, Paris, France (*Abstract Co-Author*) Consultant, Amgen Inc Consultant, F. Hoffmann-La Roche Ltd Consultant, sanofi-aventis Group Consultant, Celgene Corporation
Olivier Lucidarme, MD, Paris, France (*Abstract Co-Author*) Consultant, Bracco Group Consultant, F. Hoffmann-La Roche Ltd

Consultant, Boehringer Ingelheim GmbH

PURPOSE

FOLFIRINOX is a chemotherapy regimen, which demonstrated positive impact in pancreatic adenocarcinoma. The aim of this study was to assess Computed Tomography (CT) modifications after neoadjuvant FOLFIRINOX chemotherapy for borderline (BR) and locally advanced (LA) pancreatic adenocarcinoma.

METHOD AND MATERIALS

Thirty-six patients (M/F = 26/10, mean age 60 ± 10) with BR and LA pancreatic adenocarcinoma who had received neoadjuvant FOLFIRINOX chemotherapy and had undergone surgery were retrospectively included. Baseline CT and pre-surgical CT were reviewed by two radiologists in consensus. All lesions were classified according to NCCN classification by the radiologists and a pancreatic surgeon. Largest diameter, product of the 3 diameters (P3D), arterial (superior mesenteric/coeliac/hepatic arteries) and venous (superior mesenteric/portal veins) involvement (score = 0-5) were studied on both CT and compared to pathological data (TNM/type of resection R0-R1).

RESULTS

There were significant decreases of the largest diameter and of P3D ($p < 0.0001$) and a partial response (PR) according to RECIST was found in 17/36 patients (47%). A significantly smaller pre-surgical largest diameter and P3D were found in patients with complete R0 resection ($p = 0.019$/$p = 0.021$). The largest diameter and P3D variations were significantly higher in patients with pathological response (T0-1N0) ($p = 0.004$/$p = 0.033$). A decrease of the arterial or venous involvement was respectively found in 9 (25%) and 8 patients (22%). In the opposite progression of the vascular involvement was seen in 2 (5%) patients associated with a shorter Disease Free Survival after the surgery ($p < 0.05$). 31 patients had R0 resection and among them only 4 (13%) exhibited a downstaging according to NCCN classification, while 27 (87%) did not.

CONCLUSION

In BR and LA pancreatic adenocarcinoma, effects of FOLFIROX regimen are identified on CT. However, downstaging identification is rare even in case of resectable lesion.

CLINICAL RELEVANCE/APPLICATION

Despite a lack of NCCN downstaging during chemotherapy, most of BR and LA patients were R0 at surgery, suggesting that additional imaging patterns must be found to predict resectability post-chemotherapy.

RC209-07 Cystic Pancreatic Tumors

Monday, Nov. 30 10:10AM - 10:35AM Location: E351

Participants
Celso Matos, MD, Brussels, Belgium, (cmatos@ulb.ac.be) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Classify cystic pancreatic tumors. 2) Describe the common and uncommon imaging patterns that allow differentiation of cystic pancreatic tumors. 3) Debate the role of imaging modalities in determining options for patient management.

RC209-08 Diagnostic Performance and Image Features for Prediction of Malignant Potential of Intraductal Papillary Mucinous Neoplasm of the Pancreas: A Comparison of EUS, Contrast-enhanced CT and MRI

Monday, Nov. 30 10:35AM - 10:45AM Location: E351

Participants
Seo-Youn Choi, MD, Bucheon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jung Hoon Kim, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Mi Hye Yu, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyo Won Eun, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hae-Kyung Lee, MD, Kyungki-Do, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Min Hee Lee, MD, Bucheon-Si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Joon Koo Han, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare the diagnostic performance and image features for prediction of malignant potential in intraductal papillary mucinous neoplasm of the pancreas between EUS, CT and MRI.

METHOD AND MATERIALS

76 patients with pancreatic IPMN (benign = 37, malignant = 39) underwent EUS, contrast-enhanced CT, and MRI. EUS finding was analyzed based on the formal reports and CT and MR imaging were retrospectively analyzed by two radiologists, according to the high-risk stigmata and worrisome feature proposed by the international consensus guideline 2012. Diagnostic performance of each image modalities and image features in the evaluation of the malignant potential of IPMNs were analyzed by using receiver operating curve analysis and univariate and multivariate analyses.

RESULTS

The diagnostic performance for prediction of malignant potential was comparable among contrast-enhanced CT ($A(z)=0.7918$ in R1, $A(z)=0.8302$ in R2), MRI ($A(z)=0.7422$ in R1, $A(z)=0.7755$ in R2), and EUS ($A(z)=0.7328$) without significant difference ($p>0.05$). In multivariable analysis, enhanced solid component in CT and MRI and mural nodule in EUS (OR= 1.8 in CT, OR= 1.36 in MRI, and OR= 1.47 in EUS, $p < 0.05$), MPD diameter >= 10mm (OR= 1.3 in CT, OR= 1.4 in MRI, and OR= 1.66 in EUS, $p < 0.05$), MPD diameter of 5-9mm (OR= 1.23 in CT, OR= 1.31 in MRI, $p < 0.05$), and thickened septae or wall (OR= 1.3 in CT and MRI, $p < 0.05$) were significant variables. With CT and MRI, interobserver agreement of thickened cyst wall or septum ($k=0.6893$-0.7884) and abrupt caliber change of MPD ($k=0.5790$-0.6174) was lower than that of other variables ($k>0.80$).

CONCLUSION

The diagnostic performance for prediction of malignant potential of pancreatic IPMN was comparable among contrast-enhanced CT, MRI, and EUS without significant difference (p>0.05). Enhanced solid component in CT and MRI and mural nodule in EUS, MPD diameter 5mm, and thickened septae or wall were significant variables.

CLINICAL RELEVANCE/APPLICATION

Contrast-enhanced CT, MRI, and EUS are useful for prediction of malignant potential in pancreatic IPMN using specific image features.

RC209-09 Tumor Cellularity is a Negative Predictor of Survival in Pancreatic Cancer

Monday, Nov. 30 10:45AM - 10:55AM Location: E351

Participants
Rickmer Braren, MD, Munich, Germany (*Presenter*) Nothing to Disclose
Irina Heid, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Katja Steiger, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Marija Trajkovic-Arsic, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Markus Settles, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Andreas Steingotter, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Markus Schwaiger, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Jorg Kleef, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Irene Esposito, MD, Neuherberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Jens Siveke, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Ernst J. Rummeny, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Molecular and morphological heterogeneity are key factors for prognosis, therapy response and resistance in pancreatic ductal adenocarcinoma (PDAC). By defining subtypes of PDAC based on tumor cellularity, we applied multiparametric MRI in complex mouse models of endogenous PDAC for non-invasive detection of subtypes.

METHOD AND MATERIALS

Murine (mPDAC; N=141) and human (hPDAC; N=94 PDAC were histologically analyzed and subtyped based on tumor cellularity. Diffusion weighted- and dynamic contrast enhanced-MRI (DW-MRI, DCE-MRI) was evaluated for non-invasive characterization of mPDAC subtypes.

RESULTS

Tumor cellularity showed excellent correlation with the DW-MRI derived ADC parameter in murine PDAC (r=-0.86, CI=-0.92 - -0.78). Applied in patients with corresponding PDAC subtypes (hPDAClow, N=55; hPDACmed, N=27) revealed a significantly better prognosis of patients exhibiting low tumor cellularity (19.8 versus 13.0 months, Log rank, p<0.002). In analogy to the murine model, the ADC parameter identified hPDAC subtypes pre-operatively.

CONCLUSION

This study identifies tumor cellularity as a negative predictor in PDAC and the ADC parameter as a promising biomarker for non-invasive classification that may be used for evaluation of subtype-directed approaches.

CLINICAL RELEVANCE/APPLICATION

The presented work supports the clinical relevance of subtyping of PDAC based on tumor cellularity and identifies high sensitivity and specificity of the ADC parameter for non-invasive detection of the different PDAC subtypes. Reliable, non-invasive assessment of tumor cellularity of a particular tumor by means of ADC calculation may facilitate stratification of PDAC subtypes for outcome analysis and personalized therapeutic intervention trials.

RC209-10 Acute Pancreatitis

Monday, Nov. 30 10:55AM - 11:20AM Location: E351

Participants
Kumaresan Sandrasegaran, MD, Carmel, IN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the working party classification of acute pancreatitis. 2) Appreciate the difference between peripancreatic and pancreatic necrosis. 3) Have an understanding of how imaging findings affect endoscopic and surgical management of severe acute pancreatitis.

Handout:Kumaresan Sandrasegaran

http://abstract.rsna.org/uploads/2015/15001862/RSNA 2015 Pancreatitis.pdf

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Kumaresan Sandrasegaran, MD - 2013 Honored Educator
Kumaresan Sandrasegaran, MD - 2014 Honored Educator

RC209-11 Extrapancreatic Inflammation on Abdominal Computed Tomography for Evaluating Early Organ Dysfunction in Acute Pancreatitis Based on Revised Atlanta Classification

Monday, Nov. 30 11:20AM - 11:30AM Location: E351

Participants
Chenyang Chen SR, MD, Chengdu, China (*Presenter*) Nothing to Disclose
Zixing Huang, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose
Bin Song, MD, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

This study was conducted to assess Extrapancreatic inflammation on CT(EPIC) in predicting early organ dysfunction of patients with acute pancreatitis based on the revised Atlanta classification.

METHOD AND MATERIALS

109 patients diagnosed as acute pancreatitis from December 2013 to February 2014 were analyzed retrospectively.Outcome parameters included the length of hospital stay and the occurrences of organ dysfunction during the first week. The Balthazar score, the EPIC score, the Beside Index of Severity in Acute Pancreatitis(BISAP) and the Systemic Inflammatory Response Syndrome(SIRS) were evaluated by calculating receiver operator characteristic (ROC) curves and the area under the ROC curve.

RESULTS

In our study population of 109 patients (68 men, 41 women; median age, 44 years; age range, 16-85 years), 44 patients developed organ dysfunction, 20 patients developed persistent organ failure, 3 patients developed infection, and nobody died. The area under the ROC curve of EPIC to predict early organ dysfunction was 0.770 (95% confidence interval, 0.679-0.845), which was higher than the Balthazar score(0.641, 95% confidence interval, 0.551-0.738), similar to BISAP(0.789, 95% confidence interval, 0.701-0.862) and SIRS(0.742, 95% confidence interval, 0.650-0.821). An EPIC score of 5 or more had a 68.18% sensitivity and 80.00% specificity for predicting early organ dysfunction. The EPIC score was significantly superior to the Balthazar score to predict outcome.

CONCLUSION

In patients with acute pancreatitis, EPIC allows accurate estimation of early organ dysfunction.

CLINICAL RELEVANCE/APPLICATION

EPIC can early predict severity of acute pancreatitis, help clinicians to determine treatments and improve patients' outcomes.

RC209-13 Autoimmune Pancreatitis

Monday, Nov. 30 11:40AM - 12:00PM Location: E351

Participants
Joel G. Fletcher, MD, Rochester, MN, (fletcher.joel@mayo.edu) (*Presenter*) Grant, Siemens AG; ;

LEARNING OBJECTIVES

1) To review the diagnostic criteria for autoimmune pancreatitis. 2) To discuss the differences between Type 1 and Type 2 autoimmune pancreatitis. 3) To understand the temporal changes and morphologic patterns of contrast enhancement in autoimmune pancreatitis. 4) To describe imaging features relating to the pancreatic and intrahepatic ducts, and periductal parenchyma, in autoimmune pancreatitis that may distinguish it from cancer, chronic pancreatitis, or PSC. 5) To describe non-diagnostic but other frequently seen imaging findings of autoimmune pancreatitis. 6) To illustrate imaging findings demonstrating response to treatment in autoimmune pancreatitis, as well as recurrence after initial remission.

RC210

Abdominal Doppler (An Interactive Session)

Monday, Nov. 30 8:30AM - 10:00AM Location: E353C

GI US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC210A Imaging and Doppler of Portal Hypertension

Participants
Myron A. Pozniak, MD, Madison, WI, (mpozniak@uwhealth.org) (*Presenter*) Stockholder, Cellectar Biosciences, Inc; Support, General Electric Company

LEARNING OBJECTIVES

1) Understand the normal anatomy, anatomic variants of the hepatic vasculature. 2) Identify the normal Doppler flow profiles of the hepatic vasculature. 3) Understand the hemodynamic principles of portal hypertension and how they impact the Doppler waveforms of the hepatic arteries, portal veins and hepatic veins. 4) Understand the role of ultrasound in the evaluation of variceal pathways.

RC210B Doppler Evaluation of Mesenteric Vessels

Participants
John S. Pellerito, MD, Manhasset, NY, (johnp@nshs.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify applications for Doppler evaluation of the mesenteric arteries and veins. 2) Develop techniques to detect and interpret mesenteric flow abnormalities. 3) Explain criteria for the interpretation of significant mesenteric arterial disease.

ABSTRACT

RC210C Renal Doppler: Vessels and Beyond

Participants
Deborah J. Rubens, MD, Rochester, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the technical parameters and diagnostic criteria of color and spectral Doppler interrogation of the renal arteries, veins and parenchyma. 2) Learn and apply new information regarding Doppler ultrasound applications including vascular disease, stone disease, renal masses and renal parenchymal disease. 3) Appreciate the value of renal Doppler and its role vs other vascular imaging with CT or MRI.

ABSTRACT

Renal Doppler: Vessels and BeyondThis lecture will explore the use of Doppler ultrasound in the assessment of the kidney and its vascular supply. Doppler technique will be reviewed with particular attention to artifacts and pitfalls which may enhance or detract from diagnostic efficacy. The role of ultrasound imaging in assessment of acute as well as chronic renal dysfunction will be elucidated. The performance of Doppler ultrasound will be highlighted regarding vascular stenosis and occlusion, parenchymal perfusion, and diagnosis of renal masses and stones. Doppler techniques to avoid false negative and false positive studies will be emphasized. Controversial parameters will be stressed, in particular the use of absolute velocities versus ratios in the diagnosis of renal artery stenosis, especially in renal transplants. Surgical emergencies will be highlighted, and the role of correlative imaging with CT, MR and/or angiography will be addressed.

Active Handout:Deborah J. Rubens

http://abstract.rsna.org/uploads/2015/15001995/Active RC210C.pdf

RC211

Nuclear Medicine Series: Assessment of Cancer Treatment Response: Updates

Monday, Nov. 30 8:30AM - 12:00PM Location: S505AB

BQ NM OI

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

Participants
Terence Z. Wong, MD, PhD, Chapel Hill, NC (*Moderator*) Nothing to Disclose
Haesun Choi, MD, Houston, TX (*Moderator*) Nothing to Disclose

Sub-Events

RC211-01 Imaging Response - Earning Biomarker Status

Monday, Nov. 30 8:30AM - 9:15AM Location: S505AB

Participants
Terence Z. Wong, MD, PhD, Chapel Hill, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Compare and contrast prognostic, predictive, and pharmacodynamic biomarkers. 2) Understand the difference between integrated and integral biomarkers in clinical trials. 3) Discuss advantages and limitations of imaging biomarkers.

ABSTRACT

Serum, pathological, and imaging biomarkers are becoming increasingly important to define potential biological targets, select which patients may benefit from a particular targeted agent, and to follow patients during and following therapy. Traditionally, imaging has not been formally recognized as a biomarker, and standardization of quantitative imaging techniques remains a major challenge. However, functional and quantitative imaging techniques are now being used routinely to evaluate early response to therapy. Unlike conventional cytotoxic chemotherapy, targeted therapy can be cytostatic and selects only susceptible populations of cells. Imaging response criteria is therefore often different from standard anatomic (RECIST, WHO) criteria, and the response may be heterogeneous. In the future, both serum and imaging biomarkers will have an increasingly important role in managing patients undergoing conventional and targeted therapy.

RC211-02 Can Interim [18F]-FDG-PET or Diffusion-weighted MRI Predict End-of-Treatment Outcome in MALT Lymphoma after Immunotherapy? A Prospective Study in 15 Patients

Monday, Nov. 30 9:15AM - 9:25AM Location: S505AB

Participants
Marius E. Mayerhoefer, MD, PhD, Vienna, Austria (*Presenter*) Nothing to Disclose
Georgios Karanikas, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Kurt Kletter, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Matthias Pones, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Michael Weber, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Markus Raderer, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine whether, in in patients with MALT lymphoma, quantitative changes of glycolytic activity on interim [18F]-FDG-PET, or quantitative changes of cell density on interim diffusion-weighted MRI (DWI), relative to pre-therapeutic scans, can predict the end-of-treatment (EOT) outcome after immunotherapy.

METHOD AND MATERIALS

Our prospective IRB-approved study included patients with untreated, histologically proven, FDG-avid MALT lymphoma that underwent whole-body [18F]-FDG-PET/CT and DWI at three time-points: before treatment (baseline); after three cycles (interim); and after six cycles of rituximab-based immunotherapy (EOT). The up to three largest nodal or extranodal lymphoma lesions that were visible on both [18F]-FDG-PET and DWI were defined as target lesions at baseline. Maximum and mean SUVs (SUVmax, SUVmean), and minimum and mean apparent diffusion coefficients (ADCmin, ADCmean) were measured, and their rates of change between baseline and interim examinations (ΔSUVmax, ΔSUVmean, ΔADCmin, and ΔADCmean) were compared, using ANOVAs, between the four EOT outcomes: complete remission (CR), partial remission (PR), stable disease (SD), or progressive disease (PD). The relationship between ΔSUVs and ΔADCs was also assessed by Pearson correlation coefficients (r).

RESULTS

Fifteen patients with 25 lesions were included. Lesion-based post-hoc tests showed significant differences between CR and PR for ΔSUVmax (P<0.001), ΔSUVmean (P<0.001), and ΔADCmin (P=0.044); and between CR and SD for ΔSUVmax (P<0.001), ΔSUVmean (P<0.001), ΔADCmin (P=0.021), and ΔADCmean (P=0.022); but not between CR and PR for ΔADCmean (P=0.012); and also not between PR and SD for ΔSUVmax (P=0.98), ΔSUVmean (P=0.96), ΔADCmin (P=0.85), or ΔADCmean (P=0.99). No lesion showed PD at EOT. A substantial and significant, negative correlation between ΔSUVmax and ΔADCmin (r=-0.71, P<0.001), and ΔSUVmean and ΔADCmean (r=-0.70, P<0.001), was observed.

CONCLUSION

Both quantitative interim [18F]-FDG-PET measures and interim DWI measures may be able to predict lesion-based complete response to immunotherapy at end-of-treatment in MALT lymphoma.

CLINICAL RELEVANCE/APPLICATION

[18F]-FDG-PET and DWI may be useful for early treatment outcome prediction in patients with MALT lymphoma undergoing rituximab-based immunotherapy.

RC211-03 Whole-Body FDG-PET/MRI vs. Whole-Body MRI with DWI vs. Integrated FDG-PET/CT with Brain CE-MRI: Capability for Recurrence Assessment in Patients with Postoperative Non-Small Cell Lung Cancer

Monday, Nov. 30 9:25AM - 9:35AM Location: S505AB

Participants
Yoshiharu Ohno, MD, PhD, Kobe, Japan (*Presenter*) Research Grant, Toshiba Corporation; Research Grant, Koninklijke Philips NV; Research Grant, Bayer AG; Research Grant, DAIICHI SANKYO Group; Research Grant, Eisai Co, Ltd; Research Grant, Terumo Corporation; Research Grant, Fuji Yakuhin Co, Ltd; Research Grant, FUJIFILM Holdings Corporation; Research Grant, Guerbet SA;
Shinichiro Seki, Kobe, Japan (*Abstract Co-Author*) Nothing to Disclose
Hisanobu Koyama, MD, PhD, Kobe, Japan (*Abstract Co-Author*) Nothing to Disclose
Kota Aoyagi, Otawara, Japan (*Abstract Co-Author*) Employee, Toshiba Corporation
Hitoshi Yamagata, PhD, Otawara, Japan (*Abstract Co-Author*) Employee, Toshiba Corporation
Takeshi Yoshikawa, MD, Kobe, Japan (*Abstract Co-Author*) Research Grant, Toshiba Corporation
Sumiaki Matsumoto, MD, PhD, Kobe, Japan (*Abstract Co-Author*) Research Grant, Toshiba Corporation;
Masao Yui, Otawara, Japan (*Abstract Co-Author*) Employee, Toshiba Corporation
Yoshimori Kassai, MS, Otawara, Japan (*Abstract Co-Author*) Employee, Toshiba Corporation
Katsusuke Kyotani, RT, Kobe, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazuro Sugimura, MD, PhD, Kobe, Japan (*Abstract Co-Author*) Research Grant, Toshiba Corporation Research Grant, Koninklijke Philips NV Research Grant, Bayer AG Research Grant, Eisai Co, Ltd Research Grant, DAIICHI SANKYO Group

PURPOSE

To compare the diagnostic performance for postoperative lung cancer recurrence assessment among whole-body FDG-PET/MRI, MRI with diffusion weighted imaging (DWI) and integrated FDG-PET/CT with brain contrast-enhanced (CE-) MRI in non-small lung cancer (NSCLC) patients.

METHOD AND MATERIALS

96 consecutive postoperative NSCLC patients (52 men, 44 women; mean age 72 years) prospectively underwent whole-body MRI with and without DWI at 3T MRI system, integrated PET/CTs and conventional radiological examinations as well as follow-up examinations. When recurrence was suspected in each NSCLC patients, pathological examination was performed. Then, all patients were divided into recurrence (n=17) and non-recurrence (n=79) groups based on pathological and follow-up examinations. All co-registered PET/MRIs were generated by means of our proprietary software. Then, probability postoperative recurrence in each patient was visually assessed on all methods by means of 5-point visual scoring system. To compare diagnostic performance among all methods, receiver operating characteristic analyses were performed. Finally, diagnostic accuracy of each factor and clinical stage was statistically compared each other by using McNemar's test.

RESULTS

Area under the curves (Azs) of whole-body PET/MRI (Az=0.99) and MRI with DWI (Az=0.99) were significantly larger than that of PET/CT (Az=0.92, $p<0.05$) and conventional examination (Az=0.91, $p<0.05$). When applied feasible threshold values, specificities (SPs) and accuracies (ACs) of PET/MRI (SP: 96.2 [76/79] %, and AC: 96.8 [93/96] %) and MRI with DWI (SP: 100 [79/79] %, and AC: 96.8 [93/96] %) were significantly higher than those of PET/CT with CE-brain MRI (SP: 81.0 [64/79] %, $p<0.05$; AC: 84.4 [81/96] %, $p<0.05$) and conventional radiological examination (SP: 79.7 [63/79] %, $p<0.05$; AC: 83.3 [80/96] %, $p<0.05$).

CONCLUSION

Whole-body PET/MRI and MRI with DWI have better potential for recurrence evaluation than PET/CT with CE-brain MRI and conventional radiological examination in postoperative NSCLC patients.

CLINICAL RELEVANCE/APPLICATION

Whole-body PET/MRI and MRI with DWI have better potential for recurrence evaluation than PET/CT with CE-brain MRI and conventional radiological examination in postoperative NSCLC patients.

RC211-04 Lung Cancer: PET/CT Interpretation (Hopkins Criteria) for Therapy Assessment and Survival Outcome Prediction

Monday, Nov. 30 9:35AM - 9:45AM Location: S505AB

Participants
Rick Wray, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Charles Marcus, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Sara Sheikhbahaei, MD, MPH, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Rathan M. Subramaniam, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Travel support, Koninklijke Philips NV

PURPOSE

The aim of the study was to test a simple, reproducible, qualitative, therapy response interpretation method (Hopkins Criteria) that can be implemented on the post treatment 18F-FDG PET/CT study and to evaluate its impact on prognosis in patients with lung cancer.

METHOD AND MATERIALS

This was a retrospective study of 204 biopsy-proven lung cancer patients, who underwent a post treatment PET/CT study after completion of primary treatment from 2003 to 2012. The median follow-up was 12.1 months. The PET/CT studies were interpreted using a qualitative 5-point scoring system - Hopkins Criteria. The primary outcome was overall survival (OS), which was analyzed by Kaplan-Meier plots with a Mantel-Cox long-rank test.

RESULTS

Of the 204 patients, 88 were women and 116 were men. A total of 140 (68.6%) patients died during the follow-up period. There were 123 (61.3%) with a positive Hopkins Criteria score for residual disease and 81 (39.7%) patients with a negative score. The median survival time for patients with a positive score was 29.6 months in comparison to 51.2 months in those with a negative score (p<0.001). There was a significant difference in the OS between patients with a positive score versus those with a negative score (HR 2.01; 95%CI: 1.42-2.84; Logrank P<0.001). The Kaplan-Meier analysis also showed a significant difference in OS between patients with a positive and negative score who were treated with surgery (HR 4.72; 95%CI: 1.84-12.08; Logrank P<0.001) and those treated with chemoradiation alone (HR 1.62; 95%CI: 1.11-2.37; Logrank P=0.012). There was also a significant difference in the OS between patients with scores 1 and 2 versus score 3 versus score 4 and 5 (Logrank P<0.0001).

CONCLUSION

The 5-point qualitative therapy response Hopkins Criteria provides valuable prognostic information in patients with lung carcinoma.

CLINICAL RELEVANCE/APPLICATION

The 5-point qualitative therapy response Hopkins Criteria can predict survival outcome in post therapy patients with lung carcinoma and is recommended for surveillance in this population.

RC211-05 Response Assessment Recommendations in Solid Tumors: RECIST vs PERCIST

Monday, Nov. 30 9:45AM - 10:30AM Location: S505AB

Participants
Heather Jacene, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To compare anatomic and metabolic imaging for response assessment. 2) To discuss limitations of current widely used criteria for assessing response. 3) To discuss the benefits and limitations of metabolic imaging for response assessment.

ABSTRACT

RC211-06 Challenges of Solid Tumor Measurements and Techniques to Address This

Monday, Nov. 30 10:45AM - 11:30AM Location: S505AB

Participants
Haesun Choi, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The currently available response evaluation criteria of solid tumors and its limitations. 2) New concept of response evaluation of solid tumors. 3) Future of response evaluation of solid tumors.

ABSTRACT

RC211-07 Is There an Influence of the PERCIST Analysis Approach Used with FDG PET/CT for Evaluation of Tumor Response on Outcome Prediction in Stage IV Breast Cancer Patients?

Monday, Nov. 30 11:30AM - 11:40AM Location: S505AB

Participants
Katja Pinker, MD, New York, NY (*Presenter*) Nothing to Disclose
Christopher C. Riedl, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Leonard Ong, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Maxine S. Jochelson, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Gary A. Ulaner, MD, PhD, New York, NY (*Abstract Co-Author*) Research support, General Electric Company; Research support, F. Hoffmann-La Roche Ltd
Maura Dickler, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Wolfgang A. Weber, MD, New York, NY (*Abstract Co-Author*) Consultant, Endocyte, Inc

PURPOSE

PET Response Criteria in Solid Tumors (PERCIST) 1.0, is a framework for the evaluation of tumor response to therapy by FDG PET/CT. PERCIST recommends measuring changes in tumor FDG uptake of 1-5 lesions as measured by SUVpeak normalized for body weight. The purpose of this study was to compare analysis of 1 lesion (PERCIST_1) to analysis of up to 5 lesions (PERCIST_5) and to changes of tumor/liver ratio (TLR) of one lesion for prediction of progression-free (PFS) and disease-specific survival (DSS) in stage IV breast cancer patients under systemic therapy.

METHOD AND MATERIALS

This HPAA compliant IRB approved retrospective study included 65 patients with stage IV breast cancer who received 1st or 2nd line systemic therapy in clinical trials and had a FDG PET/CT at baseline and within 3 months after therapy initiation. Treatment response according to PERCIST_1, PERCIST_5 and TLR was correlated with PFS and DSS using Kaplan-Meier analysis/log-rank tests.

RESULTS

Response classifications using PERCIST_1, PERCIST_5 and tumor/liver ratio analysis are summarized in Table 1. All three approaches resulted in highly significant (p<0.01) differences between responders (CR+PR) and nonresponders (SD+PD) for both PFS and DSS (Figure 1). When comparing the PFS and DSS of responders there were no significant differences for PERCIST_1 vs PERCIST_5 (p=0.74), PERCIST_1 vs TLR (p=0.88) and PERCIST_5 vs TLR (p=0.64). There were also no significant differences of PFS in the group of nonresponders: (PERCIST_1 vs PERCIST_5, p=0.3; PERCIST_1 vs TLR, p=0.54; and PERCIST_5 vs TLR, p=0.62).

CONCLUSION

In metastatic breast cancer a metabolic response according to PERCIST_1, 5 and TLR is highly significantly correlated with PFS and

in metastatic breast cancer a metabolic response according to PERCIST 1, 5 and PLR is highly significantly correlated with PFS and DSS. The exact definition of a metabolic response does not have a major impact on the prognostic value of response assessment.

CLINICAL RELEVANCE/APPLICATION

Response assessment by FDG PET/CT appears to be a robust approach for monitoring tumor response to therapy in patients with metastatic breast cancer.

RC211-08 Assessment of Early Response to Treatment Using FDG PET/CT in Patients with Advanced Melanoma Receiving Immune Checkpoint Inhibitors

Monday, Nov. 30 11:40AM - 11:50AM Location: S505AB

Participants
Steve Cho, MD, Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Evan J. Lipson, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Hyung-Jun Im, MD,PhD, Madison, WI (*Presenter*) Nothing to Disclose
Esther Mena, MD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
Steven P. Rowe, MD, PhD , Parkville, MD (*Abstract Co-Author*) Nothing to Disclose
Drew M. Pardoll, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Suzanne Topalian, MD, Baltimore, MD (*Abstract Co-Author*) Consultant, Bristol-Myers Squibb Company Research Grant, Bristol-Myers Squibb Company
Richard L. Wahl, MD, Saint Louis, MO (*Abstract Co-Author*) Research Consultant, Nihon Medi-Physics Co, Ltd;

PURPOSE

Immune checkpoint inhibitors (ICI) have demonstrated antitumor activity and prolonged survival in patients with advanced melanoma. Evaluation of response to early treatment response with these agents using standard CT imaging can be challenging. A recent report of FDG-PET/CT after two cycles of ICI has been reported to be highly predictive of the final outcome. We evaluated the use of FDG-PET/CT scans as early predictors of response to therapy in patients with melanoma receiving ICI.

METHOD AND MATERIALS

Twenty patients with advanced melanoma treated with ICI therapy underwent FDG PET/CT prior to initiation of therapy (day -28 to 0; SCAN1), at day 23-28 (SCAN2) and at 16 weeks (SCAN3). FDG-PET scans were evaluated for changes in maximum standardized uptake value (SUVmax), peak SUV (SUVpeak), metabolic tumor volume (MTV), and total lesion glycolysis (TLG). CT images were used to evaluate response according to RECIST 1.1 and immune-related response criteria (irRC). Receiver-operating characteristic (ROC) analysis for prediction of tumor response used area under curve (AUC) to compare baseline SCAN1 and the percent change in PET and CT parameters between SCAN1 and SCAN2. These values were also compared to the standard RECIST 1.1 response at SCAN3.

RESULTS

Twenty evaluable patients who had completed SCAN1 and SCAN2 and had a documented radiologic and/or clinical outcome were evaluated. By RECIST 1.1 criteria 2 had partial responses (PR) and 2 complete responses (CR) at 16 weeks. One patient had stable disease >6 months and 15 had progressive disease (PD). SUVmax and SUVpeak at SCAN1 and SUVmax and SUVpeak percent change from SCAN1 to SCAN2 were not strongly predictive of tumor response, with AUC of 0.480, 0.547, 0.680, and 0.680, respectively. CT-based irRC and RECIST 1.1 were also not strongly predictive of tumor response with AUC of 0.760 and 0.787, respectively. Analyses of PET based MTV and TLG parameters are in progress.

CONCLUSION

Standard parameters of PET and CT response at baseline and early in the course of ICI therapy were not strongly predictive for response to ICI treatment in patients with advanced melanoma. These findings require further validation in a larger cohort of patients.

CLINICAL RELEVANCE/APPLICATION

Standard PET and CT parameters of early tumor response to ICI therapy are not sufficient for predicting response to therapy, and therefore development of improved imaging metrics and methods are needed.

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Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Richard L. Wahl, MD - 2013 Honored Educator

RC211-09 Analysis of PET/CT Patterns of Response to Ipilimumab in Patients with Metastatic Melanoma

Monday, Nov. 30 11:50AM - 12:00PM Location: S505AB

Participants
Brandon A. Howard, MD, Durham, NC (*Presenter*) Nothing to Disclose
Bhavana Singh, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
April Salama, Durham, NC (*Abstract Co-Author*) Consultant, Bristol-Myers Squibb Company; Advisory Board Member, Bristol-Myers Squibb Company; Institutional Research Grant, Bristol-Myers Squibb Company; Institutional Research Grant, Merck & Co, Inc
Brent Hanks, MD,PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Mustafa R. Bashir, MD, Cary, NC (*Abstract Co-Author*) Research support, Siemens AG; Research support, Bayer AG; Research support, Guerbet SA; Research support, General Electric Company; Consultant, Bristol-Myers Squibb Company
Tracy A. Jaffe, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Andrew R. Barina, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Melanoma is a serious public health problem with rising incidence worldwide. Although surgery is efficacious for early stage disease, prognosis is poor for metastatic melanoma, with median survival of less than 1 year. Previous therapies, such as interleukin-2 and chemoradiation, have had minimal impact on survival. Ipilimumab (Ipi; Bristol- Meyers Squibb, Princeton, NJ), a human monoclonal antibody against the cytotoxic T-lymphocyte associated antigen 4 (CTLA-4), was recently introduced and demonstrates improved survival in metastatic melanoma. CTLA-4 is a negative regulator of T cell activation and is exploited by melanoma cells to evade T cell immune- mediated destruction. CTLA-4 blockade by Ipi enhances host anti-tumor response. F-18 fluorodeoxyglucose PET-CT is routinely used in melanoma, however is subject to false positives when inflammatory or immune mediated processes are involved. It has recently been reported that in the setting of Ipi therapy, certain findings such as colitis, lymphadenopathy, inflammatory fat stranding may portend a favorable prognosis. We aim to further characterize the spectrum of PET/CT findings relevant to response to ipilimumab in our population.

METHOD AND MATERIALS

Patients who underwent FDG PET-CT from 2005 through Sept. 2014, and received at least one cycle of Ipi were retrospectively reviewed. PET/CT results, including unusual findings (i.e. those neither clearly malignant or benign on imaging) were recorded and correlated with clinicopathologic records and subsequent imaging.

RESULTS

103 patients met criteria for the study. Indeterminate findings on PET-CT included FDG-avid lymphadenopathy, diffuse thyroid uptake, subcutaneous nodularity, gallbladder uptake, and intracardiac uptake. A mixed pattern of response was often reported.

CONCLUSION

The most common PET/CT findings in metastatic melanoma patients on ipilimumab were FDG- avid lymphadenopathy, thyroid uptake, and subcutaneous nodularity, which did not correlate with an adverse outcome. A mixed response was often noted. Further analysis of clinical outcome data and clinical benefit analysis will be performed, including Kaplan-Meier analysis, to determine whether these correlated with improved outcomes.

CLINICAL RELEVANCE/APPLICATION

Characteristic patterns on PET/CT may imply a favorable outcome to treatment with ipilimumab in melanoma. Care must be taken not to interpret FDG uptake in lymph nodes, thyroid, and subcutaneous fat as progression.

RC212

Transcatheter Aortic Valve Replacement (TAVR)

Monday, Nov. 30 8:30AM - 10:00AM Location: N226

CH VA

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Dominik Fleischmann, MD, Palo Alto, CA (*Moderator*) Research support, Siemens AG;

Sub-Events

RC212A TAVR: The Surgeon's Perspective

Participants
Michael Fischbein, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the epidemiology, surgical and novel transcatheter treatment options for aortic stenosis. 2) Be able to analyze current evidence for the effectiveness of TAVR in different risk groups. 3) Comprehend the elements of a successful TAVR program implementation.

RC212B CTA for TAVR Planning: Current Evidence

Participants
Jonathon A. Leipsic, MD, Vancouver, BC (*Presenter*) Speakers Bureau, General Electric Company Speakers Bureau, Edwards Lifesciences Corporation Consultant, Heartflow, Inc Consultant, Circle Cardiovascular Imaging Inc

LEARNING OBJECTIVES

1) Review the recent advancements in the field of TAVR. 2) Review the published literature defining the role of MDCT for device selection and annular sizing. 3) Discuss the other ancillary roles of MDCT in TAVR planning.

Honored Educators

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Jonathon A. Leipsic, MD - 2015 Honored Educator

RC212C Measurements, Workflow, Training and Q/A

Participants
Shannon Walters, Stanford, CA, (shannon.walters@stanford.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define elements of an effective TAVR image analysis workflow. 2) Discuss the variety and applicability of measurement/imaging tools. 3) Develop training plans to improve inter observer agreement. 4) Improve efficiency and reliability through quality assurance.

RC213

Pediatric Series: MSK

Monday, Nov. 30 8:30AM - 12:00PM Location: N230

MK MR PD

ARRT Category A+ Credits: 3.50
AMA PRA Category 1 Credits ™: 3.25

Participants
Andrea S. Doria, MD, Toronto, ON (*Moderator*) Consultant, Bayer AG; Consultant, Novo Nordisk AS; Consultant, Baxter International Inc
Tal Laor, MD, Cincinnati, OH (*Moderator*) Nothing to Disclose
Siddharth P. Jadhav, MD, Houston, TX (*Moderator*) Nothing to Disclose
Sarah D. Bixby, MD, Boston, MA (*Moderator*) Nothing to Disclose

Sub-Events

RC213-01 Magnetic Resonance Imaging of Children with Juvenile Idiopathic Arthritis

Monday, Nov. 30 8:30AM - 8:50AM Location: N230

Participants
Tal Laor, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the nomenclature and criteria for the diagnosis of juvenile idiopathic arthritis (JIA) in children. 2) To recognize the sites in children commonly affected by JIA. 3) To illustrate the spectrum of abnormalities identified with magnetic resonance imaging in children with JIA.

ABSTRACT

RC213-02 Predictive Value of Magnetic Resonance Imaging in Clinically Inactive Juvenile Idiopathic Arthritis?

Monday, Nov. 30 8:50AM - 9:00AM Location: N230

Participants
Charlotte M. Nusman, MSc, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Robert Hemke, MD,PhD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Cristina Lavini, DPhil, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Dieneke Schonenberg-Meinema, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Marion Van Rossum, MD, PhD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Koert M. Dolman, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Merlijn van den Berg, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Taco Kuijpers, MD, PhD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Mario Maas, MD, PhD, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Mirkamal A. Tolend, BSc, Toronto, ON (*Presenter*) Nothing to Disclose

PURPOSE

The value of subclinical synovitis on magnetic resonance imaging (MRI) in clinically inactive patients with juvenile idiopathic arthritis (JIA) is yet to be unraveled. This study was performed to determine whether (dynamic) contrast-enhanced MRI parameters of a previously affected target joint in patients with clinically inactive JIA can predict a flare of joint inflammation during 2-year follow-up.

METHOD AND MATERIALS

Thirty-two JIA patients with clinically inactive disease at the time of MRI of the knee were prospectively included. Dynamic contrast-enhanced (DCE) MRI provided both descriptive measures and time-intensity-curve shapes, representing functional properties of the synovium. Conventional MRI outcome measures included validated scores for synovial hypertrophy, bone marrow edema, cartilage lesions and bone erosions. During a 2-year period the patients were examined at regular time points and clinical flares were registered.

RESULTS

MRI analysis revealed synovial hypertrophy in 13 (39.4%) of the clinically inactive patients. Twelve patients (37.5%) had at least one flare during 2-year clinical follow-up. Median time-to-flare was 0.68 years (IQR 0.18-1.97) and 50% of the flaring patients did so within the first 6 months (Figure 1). Persistently inactive and flaring patients differed significantly in the maximum enhancement of the DCE-MRI ($p<0.05$), whereas no difference was found between these two groups in any of the baseline scores of conventional MRI.

CONCLUSION

Our prospective clinical follow-up study indicates that the assessment of 'maximum enhancement' upon DCE-MRI may be able to predict a clinical flare within 2 years in inactive JIA patients. In the future, functional imaging biomarkers, such as DCE-MRI can be combined with serum markers or gene profiling data, leading to the construction of a predictive model to more precisely decide about treatment strategies in any individual patient.

CLINICAL RELEVANCE/APPLICATION

The presence of a relatively high maximum enhancement on dynamic contrast-enhanced MRI of the knee in clinically inactive patients with juvenile idiopathic arthritis indicates a risk of flaring.

RC213-03 Periosteal Entrapment in Salter-Harris Injuries: Too Much on the Plate

Monday, Nov. 30 9:00AM - 9:10AM Location: N230

Participants
Peter H. Van Geertruyden, MD, Fort Belvoir, VA (*Abstract Co-Author*) Nothing to Disclose
William B. Morrison, MD, Philadelphia, PA (*Presenter*) Consultant, General Electric Company Consultant, AprioMed AB Patent agreement, AprioMed AB Consultant, Zimmer Holdings, Inc
Adam C. Zoga, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Timothy G. Sanders, MD, Keswick, VA (*Abstract Co-Author*) Nothing to Disclose
Jana M. Crain, MD, Atherton, CA (*Abstract Co-Author*) Nothing to Disclose
Brendan T. Doherty, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To present a series of Salter-Harris injuries with periosteal entrapment, to better understand incidence and distribution, appearance and potential complications with regard to healing.

METHOD AND MATERIALS

Two musculoskeletal radiologists retrospectively reviewed 142 MRI exams with Salter-Harris injuries from 2007 to present for the presence of periosteal entrapment. Evaluation included Salter-Harris grade, location, presence of periosteal entrapment, and degree of entrapment measured in distance extending within the physis. Available follow-up imaging findings and clinical evaluations were recorded.

RESULTS

Of 144 Salter-Harris injuries on MRI, 59 cases were type I injuries, 48 cases were type 2 injuries, 20 cases were type 3 injuries, 14 cases were type 3 injuries, and 3 cases were type 5 injuries. The most common location for type I injuries was the distal fibula. The most common location for type 2 injuries was the distal radius. Type 3 and 4 Salter-Harris injuries showed no particular location preference. Of the 144 cases, 96 cases were in boys and 48 in girls. Average age of boys was 13 years, 9 months. The average age for girls was 12 years, 4 months.

CONCLUSION

Periosteal entrapment is observed in 7% of Salter-Harris injuries by MRI; entrapment is an under-reported phenomenon in current literature. In our series periosteal entrapment occurred most commonly at the distal tibia and fibula. Continued follow-up will reveal whether premature physeal arrest/growth disturbance is associated with periosteal entrapment.

CLINICAL RELEVANCE/APPLICATION

To make aware the frequency and potential implications of perisosteal entrapment in Salter Harris fractures.

RC213-04 Plastic Bowing Fractures of the Pediatric Forearm: Evaluation of a Novel Computer Aided Method for Detection

Monday, Nov. 30 9:10AM - 9:20AM Location: N230

Participants
Uygar Teomete, MD, Miami Beach, FL (*Presenter*) Nothing to Disclose
Yuwei Zhou, Coral Gables, FL (*Abstract Co-Author*) Nothing to Disclose
Ozgur Dandin, MD, Bursa, Turkey (*Abstract Co-Author*) Nothing to Disclose
Weizhao Zhao, Coral Gables, FL (*Abstract Co-Author*) Nothing to Disclose
Taner Dandinoglu, Bursa, Turkey (*Abstract Co-Author*) Nothing to Disclose
Onur Osman, PhD, Istanbul, Turkey (*Abstract Co-Author*) Nothing to Disclose
Ulas Bagci, PhD, MSc, Orlando, FL (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

(1) To develop a computer aided diagnosis (CAD) system for detection of plastic bowing fractures of the pediatric forearm and (2) to compare its feasibility with respect to the radiologists' interpretation.

METHOD AND MATERIALS

Following IRB approval, we retrospectively analyzed the forearm radiographs of the patients presenting to the pediatric emergency room following trauma. We included a total of 55 pediatric patients from all age groups. We used morphological operations to extract the forearm diapyseal features. In geometry, the radius of curvature, R, is a measure of the radius of the circular arc which best approximates the curve at that point. Along with the border of the bone, at every point, the more "bending" of the curve, the smaller of the radius of curvature; the "flatter" of the curve, the bigger of the radius of curvature. Average of R increases with increased bowing level. Curvature of the radial and ulnar diaphyses were caculated for the normal patients with normal interpretation and for the patients with plastic bowing fracture. Leave one out cross validation scheme was used for avoiding bias in our evaluations. Results were compared with the radiologist's interpretation. t-test was used to determine statistical significance level.

RESULTS

Curvature values were obtained from our CAD method in the training step. With a sensitivity of 80% in detecting plastic bowing fractures, we recorded 92% specificity. When compared to radiologists' conventional readings, we did not find significant differences between the proposed method and the radiologists' reading using t-test ($p>0.05$).

CONCLUSION

The proposed automated computer aided detection method can be used as a second opinion to aid the radiologist's decision making by highlighting the suspicious regions for plastic bowing fracture. To best of our knowledge, this is the first attempt towards automatizing quantitative evaluation of pediatric buckle fractures from radiographs.

CLINICAL RELEVANCE/APPLICATION

Our CAD method is fast, effective an reliable. It can be used as a standalone application or as a plugin to the PACS viewer in a radiology workstation. Its use as a second opinion may obviate the need to obtain additional radiographs of the contralateral forearm for comparison, preventing unnecessary radiation exposure to the child.

RC213-05 Growth Recovery Lines are More Common in Infants at High- vs. Low-risk for Abuse

Monday, Nov. 30 9:20AM - 9:30AM Location: N230

Participants
Matthew A. Zapala, MD,PhD, Boston, MA (*Presenter*) Nothing to Disclose
Andy Tsai, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Paul K. Kleinman, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Growth recovery lines (GRLs), AKA growth arrest, Harris, and Parks lines are transverse radiodense metaphyseal bands believed to be due to a temporary arrest of enchondral ossification-caused by local or systemic insults such as intermittent illness and malnutrition. The purpose of this study was to determine if GRLs are more common in infants at high- vs. low-risk for abuse.

METHOD AND MATERIALS

The reports of initial high detail ACR compliant skeletal surveys done at a large pediatric hospital between 1999 and 2013 were reviewed, along with the relevant clinical records. Infants were considered at low-risk for abuse if they had a skull fracture without significant intracranial injury (ICI) on CT, a history of a fall and the determination of Child Protection Team (CPT)/social work assessment. High risk infants had significant ICI, retinal hemorrhages, skeletal injuries (other than skull fractures) and the determination of risk by CPT/social work assessment. There were 53 low-risk infants (age range, 0.4-12 months; mean, 4.7 months) and 21 high-risk infants (range, 0.8-9.1; mean, 4.2). Using a 4 point Likert scale, a pediatric radiology attending and fellow independently evaluated the frontal radiographs of the lower extremities from the skeletal surveys for the presence of at least one GRL involving the distal femurs/tibias. The data were pooled and differences between the two groups were calculated.

RESULTS

Intra- and inter-reader agreement was very good (Cohen's kappa inter-reader = 0.77 and intra-reader = 0.82 and 0.84). The relative prevalence of GRLs in the low-risk groups was 38% (SD 8%, reader 1 = 17/53, reader 2 = 23/53) vs. 71% (SD 7%, reader 1 = 16/21, reader 2 = 14/21) in the high-risk group ($p < 0.001$, odds ratio 4.1, 95% CI 1.8 to 9.8).

CONCLUSION

GRLs are encountered at a significantly higher rate in infants at high- vs. low-risk for abuse. This difference may reflect the response of enchondral ossification to intermittent stresses associated with abusive events. However, since healing classic metaphyseal lesions may appear as radiodense transverse metaphyseal bands, some of the apparent GRLs in the high-risk group may reflect the residua of inflicted metaphyseal injury.

CLINICAL RELEVANCE/APPLICATION

GRLs may carry special significance when encountered in infants with suspected abuse. The possibility that some apparent GRLs may in-fact reflect healing occult metaphyseal injuries deserves further study.

RC213-06 Definition of a Scoring System for Assessment of Skeletal Age Using MRI of Hand and Wrist in Healthy Males and Females Children: Gender Differences

Monday, Nov. 30 9:30AM - 9:40AM Location: N230

Participants
Milvia Martino, MS, Rome, Italy (*Presenter*) Nothing to Disclose
Rosa Maria Ammendola, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Ernesto Tomei, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Sofia Battisti, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Richard C. Semelka, MD, Chapel Hill, NC (*Abstract Co-Author*) Research support, Siemens AG.; Consultant, Guerbet SA.
Iacopo Carbone, MD, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Carlo Catalano, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Magnetic Resonance Imaging (MRI) of hand and wrist is a radiation free tool used to create a gender specific scoring system method for the skeletal age (SA) estimation in the healthy pediatric population.

METHOD AND MATERIALS

96 healthy young male (chronological age (CA)1y6mo to 19y) and 108 females (CA range 4y to 19y) were enrolled. 9 bones of the wrist and hand have been analyzed at different stages of the skeletal maturation detecting different pattern of growth among tubular and carpal bones based on several anatomic features of the cartilaginous and osseous component .Two operators first in consensus and after 6 months blinded from CA established a MRI scoring system. Correlation between CA and MRI bone age estimation was determined with Pearson coefficient (R2). Spearman's correlation coefficient (r) was used to analyze each carpal and tubular bones stages development.

RESULTS

A significant linear correlation (R2) between MRI bone age estimation and CA was demonstrated in males (R2 = 0.976, A operators in consensus, R2 = 0.978 B first operator in the double-blind, R2 = 0.977 C second operator in double-blind) and females (R2 = 0,9694, operators in consensus, R2= 0.9751 B first operator double-blind, R2= 0.9710 C second operator in double-blind).Radius and Ulna showed a stronger correlation with the skeletal age in both males and (Radius r= 0.96; Ulna r = 0,963, p = <0.0001) females (Radius r = 0.975, Ulna r = 0.963720 p <.05000) . A good linear correlation was observed (males R2=0,96; females R^2 = 0.9472) between the sum of scoring system assigned for each subject and the CA in years. The growth curve resulting from the correlation

between CA and SA shows in males 2 peaks than 3 observed in females and related to the growth spurt in the pubertal age following by phases of deceleration.

CONCLUSION

The score system for MRI bone age estimation can be potentially used as a clinical tool to evaluate skeletal development. Males and females have patterns of maturation corresponding to a different clinical speed of growth. The MRI score system shows specific anatomical details characterizing the pubertal age when between the sexes there is a gap of about 2 years.

CLINICAL RELEVANCE/APPLICATION

Bone age estimation is performed in pediatric patients with growth failure and advanced or delayed puberty maturation mainly covering the clinical areas of endocrine, skeletal and metabolic diseases.

RC213-07 Pediatric Elbow MR

Monday, Nov. 30 9:40AM - 10:00AM Location: N230

Participants
John D. MacKenzie, MD, San Francisco, CA (*Presenter*) Research Grant, General Electric Company

LEARNING OBJECTIVES

1) Review developmental anatomy of the pediatric elbow as depicted by MRI. 2) Review technical imaging considerations when imaging the pediatric elbow with MRI. 3) Review unqiue lesions that occur at the pediatric elbow as depicted by MRI.

ABSTRACT

MRI presents an unique view into the detection and characterization of pediatric elbow pathology. Developmental changes at the pediatric elbow have a characteristic and predictable anatomy and it is important for the radiologist to understand the normal developmental appearance and separate this from pathology. Technical imaging considerations for high resolution MRI will be reviewed. Common pathologies unique to the pediatric elbow will be discussed and placed into context with their appearance on MRI.

RC213-08 Imaging of Slipped Capital Femoral Epiphysis: From Early Diagnosis to Late Sequelae

Monday, Nov. 30 10:20AM - 10:40AM Location: N230

Participants
Delma Y. Jarrett, MD, Boston, MA, (delma.jarrett@childrens.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize imaging findings of SCFE using radiographs, MR, CT, and US. 2) Understand surgical management and normal post-operative appearance of SCFE. 3) Recognize imaging findings of immediate and delayed post-operative complications of SCFE.

RC213-09 Absence of Rickets in Infants with Fatal Abusive Head Trauma and Classic Metaphyseal Lesions

Monday, Nov. 30 10:40AM - 10:50AM Location: N230

Participants
Jeannette M. Perez-Rossello, MD, Boston, MA (*Presenter*) Nothing to Disclose
Anna McDonald, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Andrew E. Rosenberg, MD, Miami, FL (*Abstract Co-Author*) Nothing to Disclose
Andy Tsai, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Paul K. Kleinman, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine if rickets is present in infant homicides with classic metaphyseal lesions (CMLs) and other skeletal injuries.

METHOD AND MATERIALS

This study was exempt from the institutional human subjects board review because the infants were all deceased. An archival review (1984-2012) was performed of the radiologic and histopathologic findings of 46 consecutive infant fatalities referred from the state Medical Examiner's Office for the evaluation of possible child abuse. Thirty infants with distal femoral histologic material were identified. Additional inclusion criteria were: 1) The medical examiner determined that the infant had sustained a head injury and that the manner of death was a homicide; 2) At least one CML was evident on skeletal survey; 3) CMLs were confirmed at autopsy; and 4) Non-CML fractures were also present. Nine infants (mean age 3.9 months, range: 1-9 months) were identified. Two pediatric radiologists independently reviewed the skeletal surveys for rachitic changes at the wrists and knees. A bone and soft tissue pathologist reviewed the distal femoral histologic sections for rickets.

RESULTS

There were no radiographic or pathologic features of rickets in the cohort.

CONCLUSION

Our findings provide no support for the view that the CML is due to rickets. Rather, they strengthen a robust literature that states that the CML is a traumatic injury commonly encountered in physically abused infants.

CLINICAL RELEVANCE/APPLICATION

This work confirms the traditional view that the classic metaphyseal lesion is a fracture encountered in abused infants rather than a manifestation of rickets. The classic metaphyseal lesion is a characteristic fracture in child abuse and should be reported as such.

RC213-10 Can Coronal STIR be Used as Screening for Acute Non-traumatic Hip Pain in Children?

Monday, Nov. 30 10:50AM - 11:00AM Location: N230

Participants
Monica M. Forbes-Amrhein, MD, PhD, Zionsville, IN (*Presenter*) Nothing to Disclose
Matthew R. Wanner, MD, Zionsville, IN (*Abstract Co-Author*) Nothing to Disclose
Trenton D. Roth, MD, Indianapolis, IN (*Abstract Co-Author*) Institutional research support, Siemens AG; Institutional research support, Koninklijke Philips NV
Megan B. Marine, MD, Carmel, IN (*Abstract Co-Author*) Nothing to Disclose
Boaz Karmazyn, MD, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate if coronal STIR can be used as a screening test for acute non-traumatic hip pain in children

METHOD AND MATERIALS

A 4 year (2008-2012) retrospective analysis was performed of pediatric (age< 18 years) pelvic MRI studies. Only patients with the following indications were accepted; acute hip pain, limping, or refusal to bear weight. Exclusion criteria included known trauma, known pelvic pathology, and follow-up studies. Each study was anonymized. The coronal STIR series and later the full MRI studies, including all series, were reviewed in a randomized order independently by a pediatric radiologist (rad1) and a musculoskeletal radiologist (rad2). The full MRI study was considered the gold standard. Analysis of the interobserver variability on the negative and positive studies of the STIR only series was reported using Kappa statistics, and overall percentage agreement.

RESULTS

A total of 127 studies were included. 103 (83%) studies were positive by both radiologists. The most common pathologies that were identified by rad1 and rad2 were: hip effusion (63% and 57%), osteomyelitis (58% and 59%) and myositis (37% and 38%). 46% and 54% patients had more than one pathology.Using the full MR as the gold standard, the STIR-only series yields a sensitivity and specificity of 94% and 83% (rad1) and 94% and 67% (rad2). In 42% and 54% of the 97 true positive STIR-only studies, inconsistencies were found on the full MR scans, the most common of which were missed osteomyelitis (20% and 21% by rad1 and rad2) and myositis (7% and 13% by rad1 and rad2). The readers agreed on 111 (87.4%) coronal STIRs (95 abnormal; 16 normal), Kappa statistic is moderate, 0.59.

CONCLUSION

Coronal STIR of the pelvis has high sensitivity (94%) with good interobserver agreement in detecting pathology in children with acute hip pain. However, the study should be supervised by a radiologist and, when positive, a full MR study should be performed as it may change findings in 42% to 54% of cases.

CLINICAL RELEVANCE/APPLICATION

Coronal STIR MR can be used as a screening for evaluation of acute non traumatic hip pain in children. However, when positive, a full MR study should be performed as it can alter the findings in about half of the cases.

RC213-11 Utility of Post Intervention Hip Spica MRI, Retrospective Evaluation of Experience at a Large Children's Hospital

Monday, Nov. 30 11:00AM - 11:10AM Location: N230

Participants
Siddharth P. Jadhav, MD, Houston, TX (*Presenter*) Nothing to Disclose
Farahnaz Golriz, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Wei Zhang, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Vinitha Shenava, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
J. H. Kan, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The objective of this study is to evaluate utility of post intervention hip spica MRI and to determine if there are pre-intervention predictors of failed reduction and need for reintervention. We also evaluate rates of reintervention after closed and open reduction.

METHOD AND MATERIALS

All patients who had hip spica MRI at our institution from 2008 to 2014 were retrospectively identified. This included 42 hips in 29 patients. Data was retrospectively reviewed including age at intervention, acetabular angle, degree of lateral and superoinferior displacement of the femoral head, intervention performed, MRI findings and need for reintervention. Wilcoxon scores were calculated and Wilcoxon two sample tests were performed to find correlation between age, acetabular angle, degree of lateral displacement and degree of superoinferior displacement and the need for re-intervention

RESULTS

Mean age at time of intervention was 20.1 months (range 4.7 to 63.8). Mean acetabular angle was 37.5 degrees (range 20-52). Mean lateral displacement was 11.2 mm (range 3-20mm) and mean superoinferior displacement was 5.7 mm (range 0-19mm). There was no correlation between age (P value=0.12), acetabular angle (P value=0.46), degree of lateral displacement (P value=0.82) and degree of superoinferior displacement (P value=0.54) and the need for re-intervention. Out of 19 hips that underwent closed reduction, 8 (42%) needed reintervention. Out of 23 hips that underwent open reduction, 1 (4%) needed reintervention but this could have been determined on the fluoroscopic images alone. Variables leading to a 42% rate of re-intervention in children who undergo closed reduction may be operator dependent or be related to extra-articular causes such as femoral version and biomechanical muscle imbalance.

CONCLUSION

Hip spica MRI is useful in determining need for reintervention after closed hip reduction. Value of MRI after open reduction is not clear since only 1 patient (4%) in our study needed reintervention after open reduction. This needs further evaluation. There is no correlation between age and pre-intervention imaging findings and the need for reintervention.

CLINICAL RELEVANCE/APPLICATION

Post intervention hip spica MRI is useful in determining need for reintervention after closed hip reduction but its role after open reduction is questionable.

RC213-12 Isolated Posteromedial Subtalar Coalitions: Incidence and Associated Morphologic Alterations of the Sustentaculum Tali

Monday, Nov. 30 11:10AM - 11:20AM Location: N230

Participants
Sarah D. Bixby, MD, Boston, MA (*Presenter*) Nothing to Disclose
Delma Y. Jarrett, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Patrick Johnston, MSc, Cambridge, MA (*Abstract Co-Author*) Employee, Ora, Inc
Susan Mahan, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Paul K. Kleinman, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine the prevalence and morphologic alterations of subtalar coalitions which lie entirely posterior to the middle facet (MF), AKA "posteromedial subtalar (PMST) coalition."

METHOD AND MATERIALS

After obtaining IRB approval, radiology records from 2004-2012 were reviewed to identify CT studies of patients with confirmed subtalar coalition. 97 subjects (48 male, 49 female, mean age 13.73 years) with subtalar coalition were identified. Electronic medical records were reviewed and symptoms of foot or ankle pain were confirmed in all subjects. In 41 (42%) subjects the coalition was bilateral. CT images of 138 subtalar coalitions were reviewed to determine site of coalition. In those patients with isolated PMST coalitions, multiplanar reformatted images along the long axis of the sustentaculum tali (ST) were generated, from which the antero-posterior dimensions of the ST and MF were measured. A posterior sustentaculum (PS) measurement was then calculated defining the posterior extension of the ST beyond the middle facet (PS = ST-MF). Ratios of the MF to the PS measurements were calculated. 33 patients undergoing CT for triplane ankle fracture (21 male, 12 female, mean age 13.70 years) served as controls. Measurement were performed independently by two readers, and intra- and inter-reader reliability was estimated via a component of variance model.

RESULTS

97 of the 138 coalitions (70.2%) affected the MF and 2 (1.4%) involved the posterior facet. There were 39 (28.2%) isolated PMST coalitions identified in 33 patients (18 male, 15 female, mean age 14.07 years). The mean AP measurement of the MF and PS in the patients with PMST coalition were 12.70 mm and 15.90 mm, respectively, compared to 16.50 mm and 6.36 mm in the control population ($p<0.001$). The ratio of the MF to PS was 0.80 for PMST coalition patients versus 2.6 for controls ($p<0.001$).

CONCLUSION

In our cohort, 1/4 of all subtalar coalitions were of the PMST variety associated with an intact, but significantly shorter MF, and longer ST. This observation may aid in accurate diagnosis and provide insights into the morphogenesis of this relatively common disorder

CLINICAL RELEVANCE/APPLICATION

The presence of a "normal" middle facet at imaging may lead to missed isolated PMST coalitions; the morphology of the ST and MF provide helpful imaging clues to the diagnosis.

RC213-13 A Retrospective Study to Evaluate the Effect Recent Changes to NICE Guidelines Will Have on Imaging of the Paediatric Cervical Spine in Blunt Trauma in the UK

Monday, Nov. 30 11:20AM - 11:30AM Location: N230

Participants
Joseph Davies, MBBS, MRCS, London, United Kingdom (*Presenter*) Nothing to Disclose
Sammy Anwuzia, BSC,MSc, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Jane Evanson, MD, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Susan Cross, MBChB, FRCR, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Paediatric cervical spine (c-spine) injury is a rare but devastating event. Imaging, particularly Computed Tomography (CT) is the investigation of choice to exclude injury. CT is however associated with increased thyroid radiation dose and risk of developing malignancy vs plain radiographs. Insufficient paediatric c-spine trauma data exists to produce robust imaging guidelines. There have been recent changes to NICE UK guidelines relating to evaluation of paediatric (<10 years) c-spine injury in trauma. We set out to investigate effects these changes have on the use of Computed Tomography (CT) in the investigation of c-spine injury

METHOD AND MATERIALS

5 year retrospective study of c-spine imaging in patients <10 years presenting to a level 1 trauma centre following blunt trauma. Data was collected relating to trauma mechanism, clinical presentation, radiologic evaluations and injury type. Patients with incomplete data were excluded. Criteria for c-spine CT in NICE head injury guideline 56 (CG 56) (GCS<8, inadequate plain radiographs, strong suspicion despite normal plain radiographs) and NICE head injury guideline 176 (CG176) (GCS <13, intubated, focal neurology, polytrauma, suspicion despite normal radiographs) were retrospectively applied to all cases with complete data to determine the proportion of patients requiring c-spine evaluation with CT.

RESULTS

278 patients underwent c-spine imaging and 217 had complete data. 80 patients met the criteria for a CT of the c-spine under CG 56, 4 of which had a significant c-spine injury. 1 patient with c-spine injury and a presenting GCS of 14 did not meet CG 56. 206 patients met the criteria for a CT under CG 176, 5 of which had a significant injury. Overall, there was one patient who presented

with significant c-spine injury who did not meet CG 56 guidelines, but falls under CG 176 criteria.

CONCLUSION

CG 176 is more inclusive and if followed will result in higher proportion of paediatric blunt trauma cases being eligible for a c-spine CT without an initial plain radiograph series. Increased paediatric thyroid radiation exposure will result.

CLINICAL RELEVANCE/APPLICATION

New guidelines are more sensitive for selecting c-spine injury, specificity is lower and results in potentially unnecessary thyroid irradiation. Further study is required to develop more robust paediatric trauma imaging guidelines.

RC213-14 Three-Point Dixon Technique for Fat Quantification and for Identifying Wasting Progression Rate of Pelvic and Thigh Muscles in Duchenne Muscular Dystrophy

Monday, Nov. 30 11:30AM - 11:40AM Location: N230

Participants
Jing Du, MD, Beijing, China (*Presenter*) Nothing to Disclose
Jiangxi Xiao, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Xiaoying Wang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Ying Zhu, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Fei Y. Li, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Three-point Dixon technique was applied to quantify fat fraction (FF) and identify the annual rate of disease progression of leg muscles in Duchenne muscular dystrophy (DMD).

METHOD AND MATERIALS

This prospective study was approved by the Ethical Committee. Ninety boys with genetically and/or pathologically confirmed DMD were recruited. Imaging was performed with a 3-T unit by using a 32 channel phased-array coil. A quantitative water-fat separation method (IDEAL-Quant) was used. Imaging parameters were as follows: TR=6.3ms, TE=1ms, 6 echoes, bandwidth=111.11 kHz, FOV=32-40cm, slice thickness=7mm, matrix=160x160, flip angle= 3°, covering from the iliac crest to the knee, total imaging time=1min3sec. Images were processed on ADW4.6 workstation and FF of each muscle was calculated. The region of interest (ROI) was manually placed by tracing the outline of the individual muscle on the section level of the muscle belly. 18 muscles on each side were analyzed. Spearman correlation test was used to evaluate the correlation between age and FF. Linear correlation was used to show the relationship between age and FF.

RESULTS

90 DMD boys aged 2-13 (mean 5.8 years) were enrolled. The gluteus maximus was the most severely infiltrated (mean FF 28.82%±19.96%), followed by the adductor magnus (mean FF 23.13%±22.47%). The least affected muscle was the obturator externus (mean FF 3.67%±1.13%). Positive correlation was obtained between FF value and age for all the muscles with correlation coefficient varied from 0.28 to 0.76. Significant correlation was seen in the gluteus maximus muscle (r=0.68), adductor magnus (r=0.74), and the quadratus femoris (r=0.74~0.76). The muscle wasting progression can be calculated as (A + B*age). A stands for a constant and B stands for annual progression rate varied from 0.3% to 6.1% for different muscles.

CONCLUSION

IDEAL-Quant method can be used to quantitatively assess leg muscle fatty infiltration and identify muscle wasting progression in DMD patients.

CLINICAL RELEVANCE/APPLICATION

IDEAL-Quant method can be used to quantitatively assess leg muscle fat infiltration in DMD. This method should be used to monitor disease severity and follow-up.

RC213-15 Sports Injuries of the Pediatric Knee

Monday, Nov. 30 11:40AM - 12:00PM Location: N230

Participants
Jennifer Stimec, MD, Toronto, ON (*Presenter*) Nothing to Disclose

RC214

Interventional Series: Venous Disease

Monday, Nov. 30 8:30AM - 12:00PM Location: S404CD

VA IR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Marcelo Guimaraes, Charleston, SC (*Moderator*) Consultant, Cook Group Incorporated ; Consultant, Baylis Medical Company; Consultant, Terumo Corporation; Patent holder, Cook Group Incorporated
Wael E. Saad, MBBCh, Ann Arbor, MI (*Moderator*) Research Grant, Siemens AG ; Consultant, Siemens AG; Consultant, Boston Scientific Corporation; Consultant, Medtronic, Inc; Consultant, Getinge AB; Consultant, Merit Medical Systems, Inc;

LEARNING OBJECTIVES

1) Describe the use of radio frequency wire in central venous occlusion. 2) List rationale for venous thrombolysis. 3) Describe the indications for balloon retrograde transvenous occlusion (BRTO). 4) Discuss one approach to establishing a PE response team.

ABSTRACT

Sub-Events

RC214-01 PE I: Diagnosis and Triage of Pulmonary Embolism

Monday, Nov. 30 8:30AM - 8:55AM Location: S404CD

Participants
Akhilesh K. Sista, MD, New York, NY, (aks9010@med.cornell.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC214-02 Additional Catheter-Directed Thrombolysis for Proximal Deep Vein Thrombosis: 5 Year Results of a Randomized Controlled Trial (The Cavent Study)

Monday, Nov. 30 8:55AM - 9:05AM Location: S404CD

Participants
Ylva Haig, MD,PhD, Oslo, Norway (*Abstract Co-Author*) Nothing to Disclose
Ole Jorgen J. Grotta, MD, Oslo, Norway (*Presenter*) Nothing to Disclose
Tone R. Enden, MD,PhD, Oslo, Norway (*Abstract Co-Author*) Nothing to Disclose
Per M. Sandset, MD,PhD, Oslo, Norway (*Abstract Co-Author*) Nothing to Disclose
Carl-Erik Slagsvold, MD, Oslo, Norway (*Abstract Co-Author*) Nothing to Disclose
Gunnar Sandbek, MD,PhD, Oslo, Norway (*Abstract Co-Author*) Nothing to Disclose
Lars O. Holmen, MD, Krakeroy, Norway (*Abstract Co-Author*) Nothing to Disclose
Geir Hafsahl, MD, Billingstad, Norway (*Abstract Co-Author*) Nothing to Disclose
Nils-Einar Klow, MD,PhD, Oslo, Norway (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To examine whether additional catheter-directed thrombolysis (CDT) had a persistent benefit in reducing post-thrombotic syndrome (PTS), and if CDT increased patency and reduced reflux 5 years following a high proximal deep vein thrombosis (DVT)

METHOD AND MATERIALS

Patients with a first-time objectively verified DVT affecting the upper femoral vein and/or iliac vein were randomized to receive conventional therapy alone or to additional CDT. PTS was assessed using the Villalta scale and the venous system was examined by duplex ultrasound and air plethysmography to define the presence of patency and/or reflux.

CONCLUSION

Follow-up after 5 years showed an additional benefit of CDT in reducing PTS, which supports "the open vein hypothesis" and underpins the importance of early clot removal to prevent PTS.

CLINICAL RELEVANCE/APPLICATION

The results of this first randomized controlled trial to evaluate the effect of additional CDT for deep vein thrombosis supports the use of CDT in selected patients.

RC214-03 When are Advanced Inferior Cava Filter Retrieval Techniques Necessary? An Analysis in 724 Procedures

Monday, Nov. 30 9:05AM - 9:15AM Location: S404CD

Participants
Kush R. Desai, MD, Chicago, IL (*Presenter*) Nothing to Disclose
James L. Laws, BS, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Samdeep Mouli, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose

Jennifer Karp, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Robert K. Ryu, MD, Chicago, IL (*Abstract Co-Author*) Consultant, Cook Group Incorporated Stockholder, EndoVention Inc Consultant, IORAD
Robert J. Lewandowski, MD, Chicago, IL (*Abstract Co-Author*) Advisory Board, BTG International Ltd; Advisory Board, Boston Scientific Corporation; Consultant, Cook Group Incorporated; Consultant, ABK Medical Inc

PURPOSE

Retrievable inferior vena cava filters (rIVCF) with prolonged dwell time often cannot be removed with standard techniques. Advanced retrieval techniques, which are increasingly necessary with prolonged rIVCF dwell time, have positively impacted overall retrieval rates. We aim to derive a dwell time at which the use of advanced techniques becomes necessary to achieve retrieval success.

METHOD AND MATERIALS

All rIVCF retrieval procedures from 1/2009-2/2015 were identified from a prospectively acquired database. We assessed patient age/sex, filter dwell time, technical success, fluoroscopy time, adverse events, and advanced retrieval technique (loop wire, balloon disruption, directional sheath, endobronchial forceps, and Excimer laser sheath) use. The data were analyzed with binomial regression analysis to calculate a dwell time in months at which advanced techniques were necessary. Statistical significance was accepted at $p<0.05$.

RESULTS

724 retrieval procedures were performed during the study period, with an overall technical success rate of 97%. Filters encountered in the study period include devices manufactured by Cook, Cordis, Bard, Argon, Volcano, and ALN. After 3.1 months (95% CI 2.8-3.4, $p<0.01$), the likelihood of requiring advanced techniques to achieve retrieval success increased significantly.

CONCLUSION

At approximately 3 months rIVCF dwell time, the likelihood of requiring advanced techniques to maintain retrieval technical success increases significantly. In patients with rIVCFs in place beyond this time point, referral to centers with expertise in advanced filter retrieval techniques may facilitate their successful retrieval.

CLINICAL RELEVANCE/APPLICATION

Retrieval of prolonged dwell rIVCFs is not uniformly attempted and is often not successful due to lack of widespread expertise in advanced retrieval techniques. These devices with prolonged implantation time are prone to increased rates of complication. In accordance with a 2010 FDA safety communication, we strongly believe that rIVCFs that are no longer indicated should be removed. Identifying a time when advanced techniques will likely be necessary may improve overall retrieval of these devices.

RC214-04 Microbubble Augmented Ultrasound Thrombolysis of Deep Vein Thrombosis in an In-vitro Model

Monday, Nov. 30 9:15AM - 9:25AM Location: S404CD

Participants
Brahman Dharmarajah, MBBS, MRCS, London, United Kingdom (*Presenter*) Nothing to Disclose
Tom Mckinnon, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Christina Keravnou, Nicosia, Cyprus (*Abstract Co-Author*) Nothing to Disclose
Michalakis A. Averkiou, PhD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Mike t. Laffan, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Edward Leen, MD, FRCR, London, United Kingdom (*Abstract Co-Author*) Equipment support, Koninklijke Philips NV Equipment support, General Electric Company Equipment support, SuperSonic Imagine Research Consultant, General Electric Company Speakers Bureau, Bracco Group Speakers Bureau, Koninklijke Philips NV Speakers Bureau, AngioDynamics, Inc Speakers Bureau, General Electric Company
Alun Davies, FRCR, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Acute thrombus removal is recommended for extensive deep vein thrombosis (DVT) to prevent the long term sequelae of post thrombptic syndrome. However, catheter-directed thrombolysis confers a haemorrhage risk of up to 20%. Sonothrombolysis is the combination of high mechanical index ultrasound (US) and ultrasound contrast microbubbles (MBs) to achieve thrombus dissolution.

METHOD AND MATERIALS

Under venous shear stress, parallel plate flow chambers coated with tissue factor were used to create a DVT specific in-vitro clot model. Therapy groups included: control, US only and US and MBs (each n=8). US was applied via a Philips iU-22 platform with a C5-1 transducer using a custom bubble destruction sequence producing a triggered mechanical index pulse of 1.31 every 1500 milliseconds. SonoVue MBs were infused at 0.2% concentration. Fluroscopically tagged fibrin captured via video microscopy provided validated blinded offline image quantification of clot surface area coverage with statistical analysis performed using a one-way ANOVA.

RESULTS

Mean surface area coverage of the clot ± SD after treatment was 85.8 ± 5.6% in the control group, 52.7 ± 7.6% in the US only group and 10.7 ± 12.37% in the US and MBs group. A significant difference of US alone over control was identified ($P<0.05$), however, a further significant effect was displayed by US and MBs ($P<0.0001$). Qualitative video microscopy clot analysis revealed maintenance of the fibrin scaffold with areas of porosity with US only whilst complete dissolution of the fibrin structure with restoration of flow was observed with US and MBs.

CONCLUSION

This pilot study using commercially available MBs and US platform identifies sonothrombolysis as a feasible non-invasive, non-irradiating technique for the dissolution of DVT. Further translational research assessing both safety and efficacy of this novel technique is warranted before it can rival current thrombus removal strategies.

CLINICAL RELEVANCE/APPLICATION

Microbubble augmented ultrasound thrombolysis is feasible and may confer less risk of haemorrhage and irradiation than current thrombus removal strategies.

RC214-05 PE II: Treatment Options for the IR and the PE Response Team

Monday, Nov. 30 9:25AM - 9:50AM Location: S404CD

Participants
Robert A. Lookstein, MD, New York, NY (*Presenter*) Consultant, Johnson & Johnson; Consultant, Boston Scientific Corporation; Consultant, The Medicines Company

LEARNING OBJECTIVES

View learning objectives under main course title.

RC214-06 Unknown Case of the Session

Monday, Nov. 30 9:50AM - 10:15AM Location: S404CD

Participants
Wael E. Saad, MBBCh, Ann Arbor, MI (*Presenter*) Research Grant, Siemens AG ; Consultant, Siemens AG; Consultant, Boston Scientific Corporation; Consultant, Medtronic, Inc; Consultant, Getinge AB; Consultant, Merit Medical Systems, Inc;

LEARNING OBJECTIVES

View learning objectives under main course title.

RC214-07 Efficacy of TIPS/Embolization for Gastric Varices

Monday, Nov. 30 10:15AM - 10:25AM Location: S404CD

Participants
Janesh Lakhoo, BS, Chicago, IL (*Presenter*) Nothing to Disclose
Ron C. Gaba, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Gastric varices (GVs)-which occur in 5-35% of liver cirrhosis patients-may lead to severe bleeding and mortality rates ~25% at 2-years. Transjugular intrahepatic portosystemic shunt (TIPS) creation with/without variceal embolization serves to decompress and occlude varices in cases refractory to medical management. However, GVs may be difficult to treat with TIPS/embolization due to distance from TIPS shunt ("proximity" theory), large size resulting in competitive outflow with TIPS ("throughput" theory), and canalization of new feeders after embolization ("recruitment" theory). This study evaluated the efficacy of TIPS with or without embolization in decompressing or occluding GVs.

METHOD AND MATERIALS

In this single center, retrospective observational study, 79 patients with GV bleeding were selected from a cohort of 303 patients who underwent TIPS from 1999-2014. Individuals with bare metal stent TIPS and patients who lacked post-TIPS imaging/endoscopic follow-up were excluded. Chart and imaging review were used to assess variceal types, feeders, and post-procedure cross-sectional imaging or endoscopic patency. The primary study outcome measure was imaging and/or endoscopic GV patency rate as a surrogate for clinical efficacy of TIPS/embolization.

RESULTS

The final cohort consisted of 26 patients (M:F 16:10, median age 54 years, median MELD 16). GVs included GEV1 (10), GEV2 (2), IGV1 (3), IGV2 (2), and unspecified (9). TIPS were hemodynamically successful in 24/26 (92%) patients with median final portosystemic pressure gradient of 7 mm Hg. Multiple GV feeders (left/posterior/short gastric veins) were present in 62% (16/26) cases. embolization was performed in 75% (18/24). 13, 3, and 10 patients had imaging, endoscopic, or both imaging/endoscopic follow-up. The incidence of GV patency on post-TIPS follow-up was 77% (20/26) (78%/75% with/without embolization) at 129 days median follow-up time. The post-TIPS rebleeding incidence was 27% (7/26), and the 90-day mortality rate was 15% (4/26).

CONCLUSION

In this study, most GVs showed persistent patency despite TIPS decompression and variceal occlusion, and rebleeding incidence was high. The findings suggest suboptimal efficacy for GV therapy, and indicate need for study of alternative/adjunctive approaches to GV treatment, such as balloon-occluded antegrade or retrograde obliteration.

CLINICAL RELEVANCE/APPLICATION

TIPS/coil embolization may not optimally decompress or occlude gastric varices.

RC214-08 Comparison of Balloon-occluded Retrograde Transvenous Obliteration (BRTO) using Ethanolamine Olate Iopamidol (EOI), BRTO Using Sodium Tetradecyl Sulfate (STS) Foam and Modified BRTO (mBRTO)

Monday, Nov. 30 10:25AM - 10:35AM Location: S404CD

Participants
Young Hwan Kim, MD, Daegu, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Young Hwan Kim, Daegu, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jung Hee Hong, Daegu, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Byoung Je Kim, Daegu, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hye Min Son, Daegu, Korea, Republic Of (*Presenter*) Nothing to Disclose

PURPOSE

To compare the clinical outcomes of BRTO using EOI, BRTO using STS foam and mBRTO.

METHOD AND MATERIALS

From April 2004 to February 2015, Eighty-three patients underwent retrograde transvenous obliteration for gastric varices were analyzed retrospectively. BRTO with EOI was performed in 38 patients, BRTO with STS foam in 25 and mBRTO in 20. Among them, we obtained follow-up data in 66 patients. Recurrence of gastric varices was evaluated by follow-up endoscopy or CT. Medical records were reviewed for the clinical and technical efficacy. Statistical analyses were performed by Chi-square test, Fisher's exact test, Kruskal-Wallis test and Mann-Whitney U test.

RESULTS

Technical and clinical success was achieved in 79 patients (95.2%). As major complications, hemoglobinuria occurred in one patient with BRTO using EOI. Recurrence of gastric varices occurred more frequently in mBRTO group ($P<0.05$). Recurrence of gastric varices occurred in 1 patient in BRTO using EOI group and 4 patients in mBRTO group with 3.3% and 22.2% of each expected one-year recurrence rates. There was no recurrence of gastric varices in all patients underwent BRTO using STS foam. Abdominal pain occurred more frequently in BRTO using EOI than BRTO using STS foam and mBRTO ($P<0.05$). Procedure time of mBRTO was shorter than the other two conventional BRTO groups($P<0.05$).

CONCLUSION

Both BRTO using STS foam and mBRTO are better than BRTO using EOI for treatment of gastric varices in terms of complication and procedure time. However, mBRTO showed frequent recurrence of gastric varices during the long-term F/U rather than conventional BRTO.

CLINICAL RELEVANCE/APPLICATION

Modified BRTO is a time-saving procedure, but mBRTO has more recurrence rate. This article makes paying attention to perform mBRTO which has more recurrence rate of gastric varices.

RC214-09 Prediction for Improvement of Liver Function after B-RTO for Gastric Varices by Transient Elastography -To Manage Portosystemic Shunt Syndrome

Monday, Nov. 30 10:35AM - 10:45AM Location: S404CD

Participants
Akira Yamamoto, Osaka, Japan (*Presenter*) Nothing to Disclose
Norifumi Nishida, MD, PhD, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroyasu Morikawa, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Atsushi Jogo, MD, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Ken Kageyama, MD, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Etsuji Sohgawa, MD, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Shinichi Hamamoto, MD, PhD, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Tohru Takeshita, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yukimasa Sakai, MD, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yukio Miki, MD, PhD, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Norifumi Kawada, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the predictive factors including transient elastography (TE) using Fibroscan® for improvement in liver function after B-RTO for GV.

METHOD AND MATERIALS

We retrospectively analyzed 47 consecutive patients who were followed up for more than 3 months after B-RTO and who had undergone TE before B-RTO between January 2011 and December 2013. The correlation between change in liver function (total bilirubin, albumin, and prothrombin time) and baseline liver function values and the liver stiffness measurement (LSM) by TE using FibroScan® was evaluated by Pearson's correlation test. Receiver operating characteristic (ROC) curves were used to determine the cut-off values with the best sensitivity and specificity in discriminating between patients who experienced improved liver function and those who did not. To clarify the cut-off level, time interval from B-RTO to aggravation of esophageal varix (EV) was also analyzed.

RESULTS

Of the 47 enrolled patients, B-RTO was successfully performed in all patients (100%).The serum albumin was significantly improved at 3 months after B-RTO (3.60 vs. 3.80, $p=0.001$). There was a significant negative correlation between the change in serum albumin and the baseline LSM ($r = -0.51$, $p<0.0001$). The best cut-off point for LSM was ≤ 22.9 kilopascals (kPa) with a sensitivity and specificity of 76.5% and 69.2%, respectively, and an area under the curve of 0.79 for predicting which patients would experience improved albumin after B-RTO. In the patient with ≤ 22 9 kPa LSM, serum albumin levels improved significantly from before to 3 months after BRTO (3.60 ± 0.46 vs. 3.90 ± 0.45 g/dl, $p<0.0001$). In the patient with ≤ 22 9 kPa LSM, serum albumin did not improve significantly from before to 3 months after B-RTO (3.50 ± 0.36 vs. 3.50 ± 0.40 g/dl, $p=0.75$). One year aggravation rate of EV after B-RTO was 9.5% in the patient with ≤ 22 9 kPa LSM, while 69.5% in the paient with > 22.9 kPa LSM.

CONCLUSION

The predictive factor for improvement in liver function after B-RTO was lower LSM (≤ 22 9 kPa) using TE. In the patients with ≤ 22 9 kPa LSM, aggravation rate of esophageal varices was very low.

CLINICAL RELEVANCE/APPLICATION

Predicter for improvement of liver function after B-RTO for garstric varices was identified by Transient Elastography.

RC214-10 BRTO-What Is It and When Should It Be Done

Monday, Nov. 30 10:45AM - 11:10AM Location: S404CD

Participants
Wael E. Saad, MBBCh, Ann Arbor, MI (*Presenter*) Research Grant, Siemens AG ; Consultant, Siemens AG; Consultant, Boston Scientific Corporation; Consultant, Medtronic, Inc; Consultant, Getinge AB; Consultant, Merit Medical Systems, Inc;

LEARNING OBJECTIVES

View learning objectives under main course title.

RC214-11 Chronic Venous Occlusions Treated with RFA

Monday, Nov. 30 11:10AM - 11:35AM Location: S404CD

Participants
Marcelo Guimaraes, Charleston, SC (*Presenter*) Consultant, Cook Group Incorporated ; Consultant, Baylis Medical Company; Consultant, Terumo Corporation; Patent holder, Cook Group Incorporated

LEARNING OBJECTIVES

View learning objectives under main course title.

RC214-12 Wrap Up and Discussion

Monday, Nov. 30 11:35AM - 12:00PM Location: S404CD

Participants

RC215

Breast Series: Hot Topics in Breast Imaging

Monday, Nov. 30 8:30AM - 12:00PM Location: Arie Crown Theater

BR DM MR US

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

Participants
Wendie A. Berg, MD, PhD, Pittsburgh, PA, (wendieberg@gmail.com) (*Moderator*) Consultant, SuperSonic Imagine; Departmental Research Grant, General Electric Company ; Departmental Research Grant, Hologic, Inc; Equipment support, Gamma Medica, Inc; Equipment support, General Electric Company; Equipment support, Hologic Inc; ;
Sarah M. Friedewald, MD, Chicago, IL (*Moderator*) Consultant, Hologic, Inc; Research Grant, Hologic, Inc
Elizabeth A. Morris, MD, New York, NY (*Moderator*) Nothing to Disclose

Sub-Events

RC215-01 Tomosynthesis

Monday, Nov. 30 8:30AM - 8:50AM Location: Arie Crown Theater

Participants
Liane E. Philpotts, MD, New Haven, CT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Assess the increasing body of literature concerning digital breast tomosynthesis. 2) Describe its use in both the screening and diagnostic mammography environments. 3) Evaluate the benefits of tomosynthesis and understand how it is dramatically changing the whole practice of breast imaging.

ABSTRACT

Tomosynthesis is revolutionizing breast imaging. The evidence to date reveals consistent reductions in false positives and increases in invasive cancer detection in screening mammography. This should have a profound effect on shifting the balance of benefits and harms of screening mammography. In addition, tomosynthesis has a dramatic effect on diagnostic mammography, resulting in expedited imaging, fewer patients requiring follow up, and increases in the positive predictive value of biopsy recommendations. Interpretation time and learning curve are considerations in utilizing tomosynthesis. Correct utilization requires careful interpretation of images and careful correlation with multi-modality imaging, particularly ultrasound. Downstream effects of tomosynthesis lead to dramatic changes in workflow. Cost analyses point to cost savings with tomosynthesis.

RC215-02 Three Consecutive Years of Screening with Digital Breast Tomosynthesis: Are the Outcomes Sustainable?

Monday, Nov. 30 8:50AM - 9:00AM Location: Arie Crown Theater

Participants
Emily F. Conant, MD, Philadelphia, PA (*Presenter*) Speaker, Hologic, Inc; Scientific Advisory Board, Hologic, Inc; Consultant, Siemens AG
Andrew Oustimov, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Lauren Pantalone, BS, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Susan Weinstein, MD, Philadelphia, PA (*Abstract Co-Author*) Consultant, Siemens AG
Elizabeth McDonald, MD, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Marie Synnestvedt, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Mitchell D. Schnall, MD, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Studies have shown improved screening outcomes when digital breast tomosynthesis (DBT) is combined with digital mammography (DM) compared to screening with DM alone. However, questions exist regarding the sustainability of outcomes over consecutive years. Are the improved DBT outcomes due to prevalence rather than incidence screening? What impact is there on interval cancer rates? We investigate these issues by comparing outcomes from 3 years of consecutive DBT screening of our entire clinic population. Cancer registry data is used to determine interval cancer rates.

METHOD AND MATERIALS

We have screened over 33,000 patients with DBT after complete conversion in 9/2011. Recall rates, cancer detection rates, PPVs, biopsy rates and interval cancer rates within 1 year will be compared over the 3 year period with prior DM rates. A positive screen is defined as recall prompting a biopsy recommendation (cat. 4, 5). Patients assigned to short-term follow-up (cat. 3) are considered negative screens. Network cancer registry data through 12/2014 is used to determine interval cancer rate (defined as symptomatic cancers presenting at <1 year).

RESULTS

The reduction in recall from the baseline DM rate of 10.4% remained statistically significant over 3 DBT years ($p<0.001$, <0.001 and 0.003, respectively) however, showed a non-significant trend upward from DBT yr 1 to 3 (8.8, 9.0 and 9.2%). Cancer detection rates/1000 screened continued to increase from baseline DM rate of 4.6 to 5.5, 5.8 and 6.1 for DBT yr 1 to 3, but the trend was non-significant ($p=0.108$). The biopsy rate remained relatively stable, however, PPV1, 2 and 3 showed continued increases over time, with the trend in PPV1 statistically significant ($p=0.025$). The interval cancer rate decreased from 0.9/1000 screened for DM to 0.5 for DBT yr 1 and 0.1 for DBT yr 2. There is not adequate follow-up to calculate interval cancer rate for DBT yr 3.

CONCLUSION

Our data shows that not only are DBT screening outcomes sustainable, there are continued trends of increased cancer detection and PPVs over time. There was also a decrease in interval cancer rate with DBT within 1 year of screening suggesting that DBT detects more, clinically significant interval cancers.

CLINICAL RELEVANCE/APPLICATION

Consecutive years of screening with DBT demonstrate sustainable and even continually improving outcomes as measured by increased cancer detection and a trend of decreasing interval cancers.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Mitchell D. Schnall, MD, PhD - 2013 Honored Educator

RC215-03 Screen-detected and Interval Cancers before, During, and after Implementation of Digital Breast Tomosynthesis in a Population-based Mammography Screening Program

Monday, Nov. 30 9:00AM - 9:10AM Location: Arie Crown Theater

Participants
Per Skaane, MD, PhD, Oslo, Norway (*Presenter*) Equipment support, Hologic, Inc; Consultant, Hologic, Inc; Support, Hologic, Inc
Sofie Sebuodegard, Oslo, Norway (*Abstract Co-Author*) Nothing to Disclose
David Gur, PhD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Randi Gullien, RT, Oslo, Norway (*Abstract Co-Author*) Support, Hologic Inc; Travel support, Hologic, Inc
Solveig S. Hofvind, Oslo, Norway (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To analyze cancer detection and interval cancer rates before, during, and after implementation of digital breast tomosynthesis (DBT) in organized breast cancer screening.

METHOD AND MATERIALS

The prospective screening trial including DBT was approved by the Ethical Committee. All participating women signed a written consent. The screening program includes women 50-69 years invited biannually to two-view full-field digital mammography (FFDM) screening. Image interpretation is carried out in batch reading mode with independent double reading using a 5-point rating scale for probability of cancer, with consensus/arbitration decision for all positive scores before final decision to recall. Incident screening exams (prior exams performed 2 years earlier) of the first years of four subsequent screening rounds in 2007 (FFDM), 2009 (FFDM), 2011 (FFDM plus DBT), and 2013 (FFDM only) were analyzed. Prevalent screen exams were excluded from analysis. Interval cancers of incident screened women in 2007, 2009, and 2011 were recorded based on a two-year follow-up period. Attendance as well as cancer detection rates (invasive cancers and DCIS), and interval cancer rates were compared using t-test with 95% confidence intervals (CI).

RESULTS

The number of women in the study population was 10.755, 11.069, 8.269, and 8.580 in 2007, 2009, 2011, and 2013, respectively. The numbers and rates (per 1.000 screen exams) of screen-detected cancers were 67 and 6.2 (95% CI 4.7-7.7), 52 and 4.7 (95% CI 3.4-6.0), 81 and 9.7 (95 CI 7.6-11.8), and 41 and 4.8 (95% CI 3.3-6.2) in 2007, 2009, 2011, and 2013. The numbers and rates (per 1.000 screen exams) of interval cancers were 22 and 2.1 (95% CI 1.2-2.9), 32 and 2.9 (95% CI 1.9-3.9), 17 and 2.1 (95% CI 1.1-3.0) for women screened in 2007, 2009, and 2011, respectively.

CONCLUSION

Implementation of digital breast tomosynthesis increases the cancer detection rate in mammographic screening. The interval cancer rate remained stable.

CLINICAL RELEVANCE/APPLICATION

Tomosynthesis increases cancer detection rate in organized mammographic screening. Further studies are needed for evaluating the interval cancer rates.

RC215-04 Missed Breast Cancer by Digital Mammography and Tomosynthesis

Monday, Nov. 30 9:10AM - 9:20AM Location: Arie Crown Theater

Participants
Miguel A. Pinochet, MD, Santiago, Chile (*Abstract Co-Author*) Nothing to Disclose
Eleonora Horvath, MD, Santiago, Chile (*Abstract Co-Author*) Nothing to Disclose
Monica P. Rochels, MD, Santiago , Chile (*Presenter*) Nothing to Disclose
Claudio S. Silva Fuente-Alba, MD, MSc, Santiago, Chile (*Abstract Co-Author*) Nothing to Disclose
Marcela Uchida, Santiago, Chile (*Abstract Co-Author*) Nothing to Disclose
Maria Paz Duran Caro, Santiago, Chile (*Abstract Co-Author*) Nothing to Disclose
Heriberto Wenzel, Santiago, Chile (*Abstract Co-Author*) Nothing to Disclose
Eduardo Soto, Santiago, Chile (*Abstract Co-Author*) Nothing to Disclose
Maria Cecilia P. Galleguillos, MD, Santiago, Chile (*Abstract Co-Author*) Nothing to Disclose
Maria E. Droguett, MD, Santiago, Chile (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Full-field digital mammography (FFDM) plus digital breast tomosynthesis (DBT) have shown to improve the sensitivity of breast cancer detection in screening programs. The purpose of this study was to analyze the imaging and histopathological characteristics of the breast cancers missed by FFDM and DBT.

METHOD AND MATERIALS

IRB approved, retrospective review of 223 consecutive breast cancers evaluated by FFDM plus DBT and Ultrasound (US) examination between 2013 and 2014. Variables assessed were: age, breast density (ACR 1-4), tumor size, location in the parenchyma, presence of microcalcifications, detailed morphological features in different imaging methods, histopathological tumor type and molecular subtype. Qualitative variables were described by percentage distribution, median and range.

RESULTS

Detection-rate of FFDM and DBT were: 83.0% and 90.5% respectively, with a substantial interreader agreement (k=0.67±0.06). In total we found 38 cancers (17%) undetectable in FFDM. Of these, 17 (7.5%) were recognized by DBT as a focal distortion or spiculated mass; 14 of them in dense breast (ACR 3-4). Finally 21 cancers (9.5%) among 20 women (median age: 53 years; range 41-64 years) were occult also in DBT, all identified by US. Breast density according to ACR 2, 3 and 4 was 10%, 65%, and 25% respectively. Median tumor size was 8.5 mm (range 4-35 mm). All cancers had an intraparenchymatous location, were microlobulated, without microcalcifications nor distortion. Two cases were DCIS and 19 infiltrating (14 ductal and 5 lobular). Thirteen were luminal A, 4 luminal B and 2 HER2 positive subtypes.

CONCLUSION

DBT improved the detection-rate of the FFDM, depicting more cancers that appeared as distortions or spiculated masses in dense breast tissue.However, the DBT also has limitations: it is not able to recognize 9.5 % of all breast cancers, mainly those small, infiltrating, non-calcified, non-spiculated, within dense parenchyma. Complementary breast US allows their earlier detection.

CLINICAL RELEVANCE/APPLICATION

We describe the imaging characteristics of those cancers that remain occult in FFDM and in DBT.

Active Handout:Monica Patricia Rochels

http://abstract.rsna.org/uploads/2015/15008044/RC215-04.pdf

RC215-05 Performance Measures When Interpreting FFDM Examinations with Increasing Experience with DBT Based Screening in a Mixed FFDM/DBT Practice

Monday, Nov. 30 9:20AM - 9:30AM Location: Arie Crown Theater

Participants
David Gur, PhD, Pittsburgh, PA (*Presenter*) Nothing to Disclose
Margarita L. Zuley, MD, Pittsburgh, PA (*Abstract Co-Author*) Research Grant, Hologic, Inc;
Jules H. Sumkin, DO, Pittsburgh, PA (*Abstract Co-Author*) Scientific Advisory Board, Hologic, Inc

PURPOSE

To assess radiologists' recall and cancer detection rates when interpreting full field digital mammography (FFDM) examinations as experience with digital breast tomosynthesis (DBT) increased in a mixed FFDM and DBT practice.

METHOD AND MATERIALS

Using MQSA and pathology reporting data, we reviewed FFDM recall and cancer detection rates for 12 radiologists in a mixed FFDM and DBT practice before they interpreted DBT and then after they each interpreted 500 DBT screening examinations, and for 5 radiologists after interpreting 1000 DBT examinations. All diagnostic recommendations were obtained from our radiology databases and outcome measures were verified by pathology. Individual and pooled data were assessed at a two sided significance level of $p<0.05$.

RESULTS

A total of 41,871 FFDM examinations were reviewed and analyzed pre DBT and 38,664 and 18,395 FFDM examinations were reviewed and analyzed post 500 and 1000 interpretations of DBT examinations, respectively. We observed no significant changes ($p>0.05$) in recall rates for FFDM as experience with DBT increased from virtually none to 500 DBT interpretations and later to over 1000 DBT interpretations. Average recall rates for FFDM were 11.4%, 11.6% and 11.3%, respectively, with no individual demonstrating a significant change or a relative rank order change on a relative scale ($p>0.05$). We observed no significant changes in cancer detection rates (CDRs) with increased experience with DBT from virtually none to 500 DBT interpretations and later to over 1000 DBT interpretations. Group CDRs were 4.7, 5.0, and 4.7 per 1000 FFDM screening examinations during the three periods, respectively ($p>0.05$). Pooled data group changes in recall rates had concordant trend changes in CDRs, albeit the trends were not statistically significant ($p>0.05$).

CONCLUSION

Despite expectations for improved performance, in particular in terms of recall rates, when interpreting FFDM examinations as experience with DBT increases in a mixed FFDM/DBT practice, radiologists reporting patterns and cancer detection rates did not change significantly.

CLINICAL RELEVANCE/APPLICATION

In a mixed FFDM/DBT practice, radiologists reporting patterns and cancer detection rates when interpreting FFDM examinations did not change significantly as experience with DBT increased.

RC215-06 Integrated Interpretation of Digital Breast Tomosynthesis and Ultrasound in Asymptomatic Women with Dense Breasts

Monday, Nov. 30 9:30AM - 9:40AM Location: Arie Crown Theater

Participants
Jung Min Chang, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Won Hwa Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Woo Kyung Moon, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare the diagnostic performances of combined digital mammography (DM) and digital breast tomosynthesis (DBT) versus combined DM and breast ultrasound (US) in asymptomatic women with dense breasts, and to evaluate the performance of an integrated interpretation of DBT and US.

METHOD AND MATERIALS

This study was approved by our Institutional Review Board and all patients provided informed consent. 196 pairs of DBT and US images from asymptomatic women with dense breasts (median age, 51 years; range, 21-77), who underwent screening examinations comprised our study population. Two independent prospective reading sessions of DBT and US with information of DM were performed in parallel by 12 radiologists blinded to the other examinations, and the integration of the results from both examination was performed by 2 expert breast radiologists in consensus, downgrading BI-RADS 3 lesions on US to BI-RADS 2 if DBT showed benign findings (BI-RADS categories 1 to 3). Sensitivity, specificity, negative predictive value (NPV), and positive predictive value (PPV) for recall of DBT, US, and their integrated results were compared using McNemar test, and Fisher's exact test.

RESULTS

Among 196 women, 27 lesions were assessed as showing suspicious findings on DBT, and 60 on US. Five cancers (mean invasive tumor size, 1.9cm; range 0-2.8cm) were detected on both DBT and US. Sensitivities and NPVs were 100% for both DBT and US. Specificity and PPVs for recall were 96.9% and 18.5% for DBT and 90.6% and 8.3% for US. The specificity for DBT was significantly higher than that of US (P=0.008). Integrated results downgrading BI-RADS 3 lesions on US to BI-RADS 2 if DBT showed benign findings yielded a significant reduction in the recall rate (30.6% vs. 12.2%, P=0.0004) without sensitivity loss.

CONCLUSION

For asymptomatic women with dense breasts, DBT combined with DM showed higher specificity than US combined with DM, and the integration of DBT information to US, resulted in decreased recall rates without loss in sensitivity.

CLINICAL RELEVANCE/APPLICATION

DBT is a beneficial method in evaluating dense breasts on DM, and integrated reading of DBT and US may induce reduction of short-term follow-up without change in sensitivity.

RC215-07 Whole Breast Ultrasound

Monday, Nov. 30 9:40AM - 10:00AM Location: Arie Crown Theater

Participants
Regina J. Hooley, MD, New Haven, CT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the indications for whole breast ultrasound. 2) Be familiar with the advantages and disadvantages of automated and handheld whole breast ultrasound. 3) Review optimal technique and strategies to improve specificity of whole breast ultrasound.

ABSTRACT

Technological advances and improvements in scan resolution have led to increased utility of whole breast ultrasound. Whole breast ultrasound is more widely accepted as a supplemental screening tool in women with dense breasts and a negative mammogram, but may also be used to evaluate disease extent in women with a new diagnosis of breast cancer. Whole breast ultrasound may be performed using a traditional handheld technique or using an automated scanner, which is less operator dependent. Careful attention to scanning technique is essential to produce high quality images, as well as to improve overall sensitivity and specificity.

ActiveHandout:Regina J. Hooley

http://abstract.rsna.org/uploads/2015/15002285/ActiveRC21.pdf

RC215-08 Update on Technologist-performed, Screening Breast Ultrasound in Women with Dense Tissue 5 Years after CT Public Act No. 09-41: How Are We Doing Now?

Monday, Nov. 30 10:00AM - 10:10AM Location: Arie Crown Theater

Participants
Liane E. Philpotts, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Madhavi Raghu, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Melissa A. Durand, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Hologic, Inc
Laura J. Horvath, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Reni S. Butler, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Paul H. Levesque, MD, Madison, CT (*Abstract Co-Author*) Nothing to Disclose
Regina J. Hooley, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Much experience has been gained during 5 years of performing screening whole breast ultrasound (US) on women with dense tissue. The purpose of this study was to assess current outcomes of these exams and compare to results obtained in our first year.

METHOD AND MATERIALS

A HIPAA-compliant, retrospective review of the breast imaging database (PenRad, MN) was performed to identify all screening ultrasound exams performed at a satellite office of a tertiary academic cancer hospital, during a 5 month period (10/1/14-2/28/15). All screening US exams were performed by dedicated breast technologists using hand-held scanning and with on-site dedicated breast radiologists available. Only cases reported as normal and dense on recent screening mammogram were included. Patients undergoing diagnostic mammography or follow up ultrasounds were not included. The BIRADS final assessment, positive predictive value (PPV3) and cancer detection rate (CRD) was determined and compared to results obtained in our practice in the first year of performing screening ultrasound (10/1/09 - 9/30/10).

RESULTS

756 supplemental screening US were performed during the time period, of which 708 (94%) were reported as normal (BIRADS 1,2). 40 cases (5%) were reported as BIRADS 3. Only eight biopsies were recommended (BIRADS 4,5 1%) of which 2 were malignant (both invasive ductal carcinoma), PPV3=25%. This yield a cancer detection rate of 2.6 per 1000 (2/756). In comparison to our first year results, there has been significant changes with and increase in the rate of BIRADS 1,2 (75% vs 94%, p<0.0001), a decrease in the rate of BIRADS 3 (20% vs 5%, p<0.0001), fewer biopsies recommended BIRADS 4,5 (5% vs 1%, p<0.0001), and an improvement in the PPV3(6.5% vs 25%, p<0.0001) with maintained CDR (3.2 vs 2.6 per 1000).

CONCLUSION

There has been a large shift in the outcome of supplemental screening ultrasound performed during 5 years with significantly fewer false positives and a higher PPV with maintained CDR, resulting in greatly improved performance of this exam.

CLINICAL RELEVANCE/APPLICATION

With experience, the performance and outcome of supplemental screening ultrasound is greatly improved.

RC215-09 Radiologists' Specificity in Reading Automated Breast Ultrasound (ABUS) Can Be Improved by Computer Aided Arbitration

Monday, Nov. 30 10:10AM - 10:20AM Location: Arie Crown Theater

Participants
Jan Van Zelst, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Tao Tan, Nijmegen, Netherlands (*Abstract Co-Author*) Research Grant, QView Medical, Inc
Andre R. Grivegnee, MD, Linkebeek, Belgium (*Abstract Co-Author*) Nothing to Disclose
Mathijn D. De Jong, MD, 's-Hertogenbosch, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Nico Karssemeijer, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Shareholder, Matakina Technology Limited; Consultant, QView Medical, Inc; Shareholder, QView Medical, Inc; Director, ScreenPoint Medical BV; Shareholder, ScreenPoint Medical BV;
Ritse M. Mann, MD, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Speakers Bureau, Bayer AG

PURPOSE

Screening for breast cancer with supplemental Automated Breast Ultrasound (ABUS) increases the amount of unnecessary recalls for benign lesions that otherwise would not have been observed. We investigated the effect of using Computer Aided Detection (CADe) software as independent arbiter on radiologists' findings on the sensitivity and specificity of ABUS for breast screening.

METHOD AND MATERIALS

The IRB waived the need for informed consent for this study. Randomly selected views from ABUS scans (Siemens, ABVS) of 89 women were included. 19 women had malignancies, 30 had benign lesions and 40 women had no abnormalities. Three dedicated breast radiologists and a 4th year resident with experience in reading ABUS participated in this multi-reader-multi-case (MRMC) study. They read all 89 cases without aid from CADe and were instructed to mark and report their findings using a 0-100 likelihood-of-malignancy scale. The CADe program (Qview Medical Inc, Los Altos, Ca.) also analyzed the 89 cases independent from the radiologists, providing suspicious region candidates for each case.The locations of the findings of the radiologists were compared to the locations of the CADe software findings. Radiologist's findings were considered suspicious only when the marked lesions matched to the candidates of CADe. Radiologists' findings that were not marked by CADe were regarded as benign.MRMC ROC analysis was used to compare the area under the ROC curve (AUC) of the normal unaided readings to the AUC of the readings after computer aided arbitration.

RESULTS

The AUC improved significantly from 0.77 to 0.88 after arbitration, using the CADe software ($p = 0.01$). Furthermore, the partial AUC in the range of 90-100% specificity also improves significantly from 0.05 to 0.065 ($p=0.04$). The radiologists' findings that were subsequently overruled by the CADe program were mostly true benign lesions or artefacts. None were malignant.

CONCLUSION

Using CADe software for computer aided arbitration has the potential to improve the specificity of breast radiologists screening with ABUS.

CLINICAL RELEVANCE/APPLICATION

CADe arbitration may help to identify unnecessary referrals for non-malignant lesions that can be reevaluated by second readers and potentially increase specificity without losing sensitivity.

RC215-10 Supplemental Automated Breast Ultrasound Screening in BRCA Gene Mutation Carriers; Is There Any Value?

Monday, Nov. 30 10:20AM - 10:30AM Location: Arie Crown Theater

Participants
Jan Van Zelst, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Gwendolyn Woldringh, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Roel D. Mus, MD, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Peter Bult, MD, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Matthieu Rutten, MD, Hertogenbosch, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Ritse M. Mann, MD, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Speakers Bureau, Bayer AG
Nicoline Hoogerbrugge, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Nico Karssemeijer, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Shareholder, Matakina Technology Limited; Consultant, QView Medical, Inc; Shareholder, QView Medical, Inc; Director, ScreenPoint Medical BV; Shareholder, ScreenPoint Medical BV;

PURPOSE

Intensive yearly breast cancer screening programs for BRCA carriers with MRI and mammography (XM) detect many cancers at an

early stage. However, BRCA carriers still present with interval cancers. In this prospective study we investigated whether automated breast ultrasound (ABUS) leads to earlier or additional detection of breast cancer.

METHOD AND MATERIALS

This study was approved by a local IRB and is HIPAA compliant. 295 female BRCA gene mutation carriers signed informed consent for this study. They were offered 5 round of screening in two years. A team of 4 dedicated breast radiologists read all examinations. We analyzed sensitivity, specificity and positive predictive value (PPV) of all three modalities. Furthermore, we retrospectively reevaluated prior ABUS scans of cancer patients and the ABUS scans of ultrasound negative cases in this cohort.

RESULTS

Out of 295 BRCA gene mutation carriers, 16 women were diagnosed with a screening-detected breast cancer. In six women, pure DCIS with no invasive component was found. None of the DCIS, not prospectively or in retrospect, was found on ABUS. In ten women, invasive breast cancer (IBC) was detected. Seven of these IBCs were found on ABUS. No additional cancers were found with ABUS. For six out of ten IBCs a prior ABUS scan was available. In retrospect, two IBCs (33,3%) were retrospectively visible on the ABUS scan six months earlier and one of these was detected but classified as BI-RADS 2. Also two interval IBCs (12.5%) occurred in between screening rounds and one of these cancer was also detected six months earlier but classified as BI-RADS 2. For XM, MRI, and ABUS sensitivity was 0.50, 0.88 and 0.44, specificity 0.97, 0.95 and 0.95 and PPV 0.32, 0.28 and 0.09, respectively

CONCLUSION

In our BRCA screening program, MRI and XM together detect most of the cancers. In this study, adding ABUS did not increase cancer detection. In retrospect, some cancers were seen earlier, but regarded benign due to a benign appearance, which is common in the BRCA population.

CLINICAL RELEVANCE/APPLICATION

High interval cancer rates in the BRCA carrier population justifies intensifying the yearly screening regimen of MRI and XM, however at this point adding ABUS does not seem to offer a solution.

RC215-11 Supplemental Screening US in Combination with Elastography and Color Doppler US: Interim Results of a Prospective Multicenter Study

Monday, Nov. 30 10:30AM - 10:40AM Location: Arie Crown Theater

Participants
Su Hyun Lee, MD,PhD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Sung Ui Shin, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
A Jung Chu, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Min Sun Bae, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Woo Kyung Moon, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To validate the added value of elastography and color Doppler ultrasonography (US) for supplemental screening US in a multicenter study.

METHOD AND MATERIALS

This study was conducted with institutional review board approval, and written informed consent was obtained. From November 2013 to December 2014, 1,241 women (mean age, 46 yrs) with breast masses (mean size, 1.0cm) detected on supplemental screening US and assessed as BI-RADS category 3 or higher were prospectively recruited from 10 tertiary care centers. After identifying the mass of interest on B-mode US, elastography (strain elastography in 4 sites; shear-wave elastography in 6 sites) and color Doppler US were performed. Investigators assessed the likelihood of malignancy as a percentage at the time of enrollment using the four data sets: B-mode US alone, B-mode US with elastography, B-mode US with color Doppler US, and B-mode US with elastography and color Doppler US. Reference standard of biopsy or at least 1 year of follow-up was completed in 1,050 women (84.6%) and included in the interim analysis.

RESULTS

71 of 1,050 breast masses (6.8%) were malignant. The areas under the receiver operating characteristics curve (AUC) of B-mode US increased from 0.878 to 0.922 (P=.039) and 0.911 (P=.157) when elastography or color Doppler US was added, respectively. When both elastography and color Doppler US were added to B-mode US, the highest AUC (0.957) was achieved (P<.001). The majority of breast masses in our cohort (91.5%, [961/1050]) was assessed as BI-RADS category 3 or 4A on B-mode US and included 25 malignancies (9 DCIS, 16 invasive carcinoma). None of invasive cancers but only one DCIS showed negative findings on both elastography and color Doppler US. If the BI-RADS category 3 or 4A masses with negative findings on both elastography and color Doppler US were managed with 1-year follow-up, a considerable number of benign biopsies (84.0%, [539/642]) and unnecessary short-term follow-up (85.7%, [252/294]) can be reduced yielding higher PPV (27%, [70/258]) compared to that of B-mode US alone (6.8%, [71/1050]).

CONCLUSION

Combined use of elastography and color Doppler US can increase the PPV of supplemental screening US for breast cancer detection.

CLINICAL RELEVANCE/APPLICATION

Combined use of elastography and color Doppler US can reduce a considerable number of unnecessary biopsies or short-term follow-up induced by supplemental screening breast US.

RC215-12 Breast MRI: Screening and Diagnostic Use

Monday, Nov. 30 10:50AM - 11:10AM Location: Arie Crown Theater

Participants
Christiane K. Kuhl, MD, Bonn, Germany (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To list shortcomings of mammographic screening for breast cancer. 2) To define the term 'overdiagnosis' and distinguish it from 'false positive diagnoses'. 3) To list the current indications for screening with Breast MRI. 4) To describe pathophysiological processes that determine diagnosis of breast cancer in MRI vs. in mammography. 5) To list the advantages and limitations of non-mammographic screening.

RC215-13 Prospective Abbreviated MRI (AB-MR) Exam in a Screening Cohort Compared with Conventional Breast MRI

Monday, Nov. 30 11:10AM - 11:20AM Location: Arie Crown Theater

Participants
Claudia R. Seuss, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Yiming Gao, MD, New York, NY (*Presenter*) Nothing to Disclose
Amy N. Melsaether, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Hildegard B. Toth, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Linda Moy, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate an AB-MR in women at intermediate and high-risk (HR) for breast cancer.

METHOD AND MATERIALS

An IRB approved study was performed on 86 asymptomatic women who underwent 114 breast MRI exams from 12/2011 - 12/2013. All women were at risk for breast cancer, had dense breasts, had surgery and/or follow up imaging. The breast MRI was performed on a 3T magnet with an acquisition time of 10 minutes. A single reader prospectively interpreted the AB-MR by reviewing the first post-contrast scan, T2 scan and prior studies. Comparison was made to the original diagnostic interpretation. Also, two additional readers retrospectively review the AB-MR exams. Final BIRADS assessment and confidence score was assessed for each lesion.

RESULTS

Of 86 women, 17 (19.8%) at HR, of which 11 (12.8%) were BRCA carriers, and 58 (67.4%) were at intermediate risk. Mean age was 46 years, range 29-76 years. Mean lesion size was 0.7cm (range 0.3 - 4cm). Sensitivity was 100%; 8 cancers (3 DCIS and five invasive cancer) were identified by the readers. All four cancers in BRCA carriers were identified by all readers. Using the abridged protocol, the specificity was 71% and an additional 14 findings were identified prospectively. The specificity for the retrospective review was 59 - 76%. Kappa score showed good interobserver agreement among the 3 readers. Mild to moderate BPE (p=0.02) small lesion size (< 0.6cm) (p=0.03) and absence of high signal T2 correlate (p=0.01) were significantly correlated with decreased confidence by all 3 readers. Of the 114 exams, 78 (68.4%) were originally assessed as BIRADS 1 or 2, 9 (7.9%) as BIRADS 3, 27 (23.7%) as BIRADS 4 or 5. Among the 3 readers, there was a statistically increase rate of BIRADS 3 assessments - 9.1 -17.6% (p=0.04) but not for BIRADS 4 assessments 19.2 -26.3% (p=.76).

CONCLUSION

An abridged breast MRI in a screening population had a high sensitivity but moderate specificity.

CLINICAL RELEVANCE/APPLICATION

An AB-MR screening exam can detected all the breast cancers but at the expense of a higher rate of follow up imaging.

RC215-14 Efficacy of Annual MRI for High-risk Breast Cancer Screening

Monday, Nov. 30 11:20AM - 11:30AM Location: Arie Crown Theater

Participants
Sarah Stamler, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Janice S. Sung, MD, New York, NY (*Presenter*) Nothing to Disclose
Jennifer B. Kaplan, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Tammy Huang, MD, Short Hills, NJ (*Abstract Co-Author*) Nothing to Disclose
Carol H. Lee, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
D. David Dershaw, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Elizabeth A. Morris, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Christopher E. Comstock, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the need for annual MRI in high-risk screening.

METHOD AND MATERIALS

IRB approved retrospective review was performed to identify breast cancers detected on screening breast MRI between January 2005-December 2010. Medical records were reviewed for risk factors (family history, personal history, BRCA status, prior high risk lesion) and tumor histopathology. The time intervals between the MRI on which the cancer was detected and the patient's baseline and most recent prior screening MRI were determined.

RESULTS

18,065 screening MRIs in 7,517 women were performed during the study period. 170 cancers were detected in 167 women (2.2%).

63/170 (37%) cancers were detected on baseline MRI. Of 107 (63%) cancers detected on a subsequent MRI, 81 (75%) were invasive, mean size= 0.7 cm, 9/107 (8%) node positive. 82/107 (77%) had a negative screening MRI within 1.3 years prior to the MRI on which the cancer was detected. Cancers were found at 1 year follow up (<1.5 years) in 17 (16%), at 2 years (1.5-2.5) in 25 (23%), and 65 (61%) on additional years of follow up. Results were independent of risk factors.

CONCLUSION

Annual MRI effective detects node negative, subcentimeter invasive cancers in a high-risk population. These cancers were not seen on MRI 1 year earlier suggesting the need for annual screening in this population.

CLINICAL RELEVANCE/APPLICATION

Annual MRI is the most appropriate screening interval for high-risk women, detecting node negative subcentimeter invasive cancers.

RC215-15 Longitudinal Results of a Breast MRI Screening Program for Patients at High and Intermediate Risk: Does BRCA Status Matter?

Monday, Nov. 30 11:30AM - 11:40AM Location: Arie Crown Theater

Participants
Suzan Vreemann, MSc, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Albert Gubern-Merida, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Susanne Lardenoije, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Bram Platel, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Nico Karssemeijer, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Shareholder, Matakina Technology Limited; Consultant, QView Medical, Inc; Shareholder, QView Medical, Inc; Director, ScreenPoint Medical BV; Shareholder, ScreenPoint Medical BV;
Ritse M. Mann, MD, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Speakers Bureau, Bayer AG

PURPOSE

Breast cancer screening in women at elevated risk is performed with yearly MRI and mammography. This includes women with BRCA mutations and women at elevated risk for other causes (mainly family history). The purpose of this study was to assess differences between BRCA mutation carriers and non-BRCA patients in a longitudinal MRI screening program in terms of recall rate, positive predictive value, and detection.

METHOD AND MATERIALS

An IRB approved, retrospective review of patient files from women screened with breast MRI between 2003 and 2013 was performed at our academic center. We analysed 9.504 screening MR examinations in 2843 women (age: 45 ± 12.09 years), including 761 BRCA patients, and 2082 non-BRCA patients. Recall rate (RR), positive predictive value (PPV), and cancer detection rate (CDR) were evaluated for first round examinations and follow-up examinations separately. BRCA patients were compared with non-BRCA patients. Chi-square tests were used to determine statistical significance.

RESULTS

The RR for BRCA patients in the first round of screening was 86.07 per 1000 examinations and 52.58 per 1000 examinations in non-BRCA patients ($p<0.001$). The PPV for BRCA patients in the first round of screening was found to be 0.44, compared to 0.50 in non-BRCA patients ($p=0.013$). The CDR was 38.25 per 1000 examinations for BRCA patients and 26.53 per 1000 examinations for non-BRCA patients ($p<0.001$). In follow up, the RR was found to be 24.92 per 1000 examinations for BRCA patients and 22.81 per 1000 examinations for non-BRCA patients ($p<0.001$). The PPV was 0.46 for BRCA patients and 0.21 for non-BRCA patients ($p<0.001$). CDR was 11.42 per 1000 examinations for BRCA patients and 4.86 per 1000 examinations for non-BRCA patients ($p<0.001$).

CONCLUSION

RR and CDR are high for all patients in the first round. RR and CDR significantly decreased in follow-up rounds ($p<0.001$). PPV remained at an acceptable level for both patient groups, and remains particularly high in BRCA carriers. RR, PPV, and CDR differed significantly between BRCA and non-BRCA patients in both first and follow up rounds.

CLINICAL RELEVANCE/APPLICATION

These results underline that MRI is an excellent tool for screening high risk patients. Cancer detection is very high in the first round in all patients, but remains high only in BRCA carriers in follow up rounds.

RC215-16 Ultrafast Dynamic Contrast Enhanced (DCE) MRI of the Whole Breasts: A Novel Imaging Technique for Breast Cancer Detection with Super High Temporal Resolution- Comparison of MIP Images between Ultrafast MRI and Regular DCE MRI

Monday, Nov. 30 11:40AM - 11:50AM Location: Arie Crown Theater

Participants
Hiroyuki Abe, MD, Chicago, IL (*Presenter*) Consultant, Seno Medical Instruments, Inc
Naoko Mori, MD, PhD, Sendai, Japan (*Abstract Co-Author*) Nothing to Disclose
Keiko Tsuchiya, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Kirti M. Kulkarni, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Deepa Sheth, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
David V. Schacht, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Federico Pineda, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Gregory S. Karczmar, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Milica Medved, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate whether DCE ultrafast MRI (UFMRI) is equal or superior to regular DCE MRI in terms of cancer detection using maximum intensity projection (MIP) images.

METHOD AND MATERIALS

The acquisition protocol of UFMRI consisted of 5 pre and 8 post-contrast bilateral, fat-suppressed ultrafast acquisitions of whole breasts, with temporal resolution of 7 sec for 3T (spatial resolution: 1.5 x 1.5 x 3 mm), or 9 sec for 1.5T (spatial resolution: 1.5 x 1.5 x 3.75 mm); followed by four high spatial resolution acquisitions (spatial resolution: 0.8 x 0.8 x 0.8 mm) with temporal resolution of 75 sec for 3T or followed by five acquisitions (spatial resolution: 1.0 x 1.0 x 1.0 mm) with temporal resolution of 65 sec for 1.5T. Two radiologists compared MIP images of regular MRI (first phase) and UFMRI (first to eighth phase) of 16 patients with breast cancer, to see if tumors are detectable with MIP images of each acquisition method. In total 30 known cancers were evaluated.

RESULTS

All 30 masses (100%) were detected on MIP images of the UFMRI, while 22 masses (73%) were detected on the MIP image of the regular MRI. Among the 22 masses detected on both, 3 masses were subtle on the regular MIP, but clearly seen on the UFMRI MIP. Eight masses were not visible on regular MRI due to strong parenchymal enhancement (6 masses), misregistration artifacts (1 mass), and overwrap with large vessels (1 mass).

CONCLUSION

UFMRI could represent a better method than regular MRI for the detection of breast cancer with MIP images.

CLINICAL RELEVANCE/APPLICATION

Enhancing lesions are clearly visualized with UFMRI due to the lack of interference from background parenchymal enhancement. MIP images of UFMRI may be useful as a new screening MRI protocol which would shorten the performance and interpretation time without lowering the sensitivity and therefore decrease costs.

RC215-17 Abbreviated MRI (AB-MR) of the Breast - Do We Need a Second Post-Contrast Scan?

Monday, Nov. 30 11:50AM - 12:00PM Location: Arie Crown Theater

Participants
Amy N. Melsaether, MD, New York, NY (*Presenter*) Nothing to Disclose
Yiming Gao, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Claudia R. Seuss, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Laura Heacock, MS, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Linda Moy, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

AB-MR exam has a high sensitivity for the detection of breast cancers. However, for AB-MR to be an effective screening tool, it should maintain a high sensitivity and specificity. The purpose of this study was to assess the diagnostic accuracy of an AB-MR using one and two post-contrast scans in a screening cohort.

METHOD AND MATERIALS

An IRB approved retrospective review of 145 women with 205 findings who underwent a breast MRI at 3T was performed by two readers. Women with dense breasts who were at risk for breast cancer were included. 61 (42%) women were newly diagnosed with breast cancer and 84 (58%) were asymptomatic high-risk women. The scan time for the 3 T1-scans was 4 minutes; the scan time for the T2-sequence was 4 minutes. Prior to this study, each reader interpreted 400 AB-MR exams. Final BIRADS assessment and confidence score was assessed for each lesion. Comparison was made to the original diagnostic interpretation.

RESULTS

73 (97%) of 76 invasive cancers and all 61 known cancers, especially those presenting as masses were detected on the first post-contrast scan. However, the second post-contrast scans allowed improved characterization of foci and NME but not for masses ($p<0.03$). Of interest, about 10 (50%) of 20 DCIS were better seen on the second post contrast scan. Seven of 10 lesions were low or intermediate grade DCIS. With a single post contrast data set, 15 (10.3%) incidental NME not reported on the full breast MRI protocol was noted and recommended for additional imaging, follow-up or biopsy. The second post-contrast scan was as such able to downgrade a BIRADS 3 assessment in 9 (60%) lesions to a BIRADS 2 diagnosis assessment, none of which were malignant at follow-up. One interval cancer, low grade DCIS, was missed by both readers on the abbreviated two post-contrast data set protocol.

CONCLUSION

In an intermediate risk population with dense breasts, a second post-contrast scan both increased cancer detection and improved characterization of benign lesions, which led to a decrease in BI-RADS 3 assessments.

CLINICAL RELEVANCE/APPLICATION

Two post-contrast scans may be sufficient for an AB-MR exam to have a high sensitivity and specificity.

RC216

Communicating Effectively with Patients (Sponsored by the RSNA Public Information Committee)

Monday, Nov. 30 8:30AM - 10:00AM Location: S104A

PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Judy Yee, MD, San Francisco, CA, (judy.yee@ucsf.edu) (*Moderator*) Research Grant, EchoPixel, Inc
Stephen D. Brown, MD, Boston, MA, (stephen.brown@childrens.harvard.edu) (*Presenter*) Nothing to Disclose
Stuart G. Silverman, MD, Brookline, MA, (sgsilverman@partners.org) (*Presenter*) Author, Wolters Kluwer nv
Michael J. Callahan, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Answer patient questions about radiation dose and address concerns about risk. 2) Apply a standardized checklist to the informed consent conversation that is patient centered, quality driven, and legally sound. 3) Effectively deliver good and bad results and disclose medical errors.

ABSTRACT

Patients are becoming increasingly involved in their healthcare. Frequently, they turn to the Internet for information on their conditions, diagnosis and treatment options. With the vast amount of information available-both reliable and unreliable-to patients, it is critical that radiologists be able to provide context, help patients to be better informed decision makers in their healthcare, and educate patients on benefits versus risks of the procedures they may undergo. This course will provide specific examples and a strategy for communicating honestly and directly with patients.

Active Handout:Stephen David Brown

http://abstract.rsna.org/uploads/2015/15003260/RC216.pdf

RC217

Quantitative CT and MR Perfusion Imaging

Monday, Nov. 30 8:30AM - 10:00AM Location: S504CD

CT GI MR OI BQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Max Wintermark, MD, Lausanne, Switzerland, (max.wintermark@gmail.com) (*Moderator*) Advisory Board, General Electric Company;

LEARNING OBJECTIVES

1) To understand the principles of CT perfusion analysis for tumor assessment. 2) To understand the pathophysiological basis of CT perfusion parameters for tumors. 3) To understand unique CT perfusion analysis of the liver due to its characteristic dual blood supply. 4) To describe the potential clinical applications, with a focus on hepatic and extrahepatic applications and clinical trials. 5) To discuss several recent challenging issues regarding CT perfusion. 6) To discuss areas for further development including assessment of tumor heterogeneity.

ABSTRACT

With the emergence of novel targeted therapies for cancer, imaging techniques that assess tumor vascular support have gained credence for response assessment alongside standard response criteria. CT perfusion techniques that quantify regional tumour blood flow, blood volume, flow-extraction product, and permeability-surface area product through standard kinetic models, are attractive in this scenario by providing evidence of a vascular response or non-response. Additionally, these techniques may provide prognostic and predictive information to the clinician. Their increasing acceptance in oncological practice in recent years has been related to the combination of clinical need and technological improvements in CT, including faster tube rotation speeds, higher temporal sampling rates, the development of dynamic 3D acquisitions and development of commercial software programmes embedded within the clinical workflow. Recently published consensus guidelines provide a way forward to perfoming studies in a more standardized manner. To date single centre studies have provided evidence of clinical utility. Future studies that include good quality prospective validation correlating perfusion CT to outcome endpoints in the trial setting are now needed to take CT perfusion forward as a biomarker in oncology.These presentations will cover the principles of CT perfusion analysis for tumor assessment and its pathophysiological basis. Clinical applications will be discussed focusing on hepatic and extrahepatic applications and clinical trials. Areas for further development including assessment of tumor heterogeneity will also be discussed.

Sub-Events

RC217A CT Perfusion in Oncology: Hepatic Imaging

Participants
Se Hyung Kim, Seoul, Korea, Republic Of (*Presenter*) Research Grant, Mallinckrodt plc; Research Grant, Samsung Electronics Co Ltd

LEARNING OBJECTIVES

1) To understand basic principles, acquisition protocol, and pharmacokinetic models of CT perfusion. 2) To learn unique CT perfusion analysis of the liver due to its characteristic dual blood supply. 3) To describe the potential clinical applications, with a focus on hepatic applications. 4) To discuss several recent challenging issues regarding CT perfusion.

ABSTRACT

RC217B CT Perfusion in Oncology: Extrahepatic Imaging

Participants
Vicky J. Goh, MBBCh, London, United Kingdom (*Presenter*) Research Grant, Siemens AG; Speaker, Siemens AG

LEARNING OBJECTIVES

1) To understand the principles of CT perfusion analysis for tumor assessment. 2) To understand the pathophysiological basis of CT perfusion parameters for tumors. 3) To describe the potential clinical applications, with a focus on extrahepatic applications and clinical trials. 4) To discuss areas for further development including assessment of tumor heterogeneity.

ABSTRACT

With the emergence of novel targeted therapies for cancer, imaging techniques that assess tumor vascular support have gained credence for response assessment alongside standard response criteria. CT perfusion techniques that quantify regional tumour blood flow, blood volume, flow-extraction product, and permeability-surface area product through standard kinetic models, are attractive in this scenario by providing evidence of a vascular response or non-response. Additionally, these techniques may provide prognostic and predictive information to the clinician. Their increasing acceptance in oncological practice in recent years has been related to the combination of clinical need and technological improvements in CT, including faster tube rotation speeds, higher temporal sampling rates, the development of dynamic 3D acquisitions and development of commercial software programmes embedded within the clinical workflow. Recently published consensus guidelines provide a way forward to perfoming studies in a more standardized manner. To date single centre studies have provided evidence of clinical utility. Future studies that include good quality prospective validation correlating perfusion CT to outcome endpoints in the trial setting are now needed to take CT perfusion forward as a biomarker in oncology. This presentation will cover the principles of CT perfusion analysis for tumor assessment and its pathophysiological basis. Clinical applications will be discussed focusing on extrahepatic applications and clinical trials. Areas for further development including assessment of tumor heterogeneity will also be discussed.

RC217C Quantitative MR Perfusion Imaging of the Brain

Participants
Max Wintermark, MD, Lausanne, Switzerland, (max.wintermark@gmail.com) (*Presenter*) Advisory Board, General Electric Company;

LEARNING OBJECTIVES

1) Understand the difference between quantitative and qualitative perfusion measurements. 2) Distinguish several approaches for obtaining quantitative perfusion maps in the brain. 3) Appreciate the strengths and weaknesses between the two major techniques, arterial spin labeling and bolus contrast dynamic susceptibility imaging.

RC218

Have RADS Gone Wild? Remaining Challenges of Standardized Reporting and Data Systems

Monday, Nov. 30 8:30AM - 10:00AM Location: N229

OI IN SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC218A BI-RADS: Why Bother?

Participants
Carol H. Lee, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the rationale behind the development of BI-RADS. 2) Comprehend the application of BI-RADS in clinical practice. 3) Recognize the contribution of BI-RADS in improving patient outcomes.

RC218B LI-RADS: Pros, Cons and Solutions

Participants
Claude B. Sirlin, MD, San Diego, CA (*Presenter*) Research Grant, General Electric Company; Speakers Bureau, Bayer AG; Consultant, Bayer AG ; ;

LEARNING OBJECTIVES

1) To review the advantages, challenges, solutions, and future directions for standardized reporting of liver imaging examinations using LI-RADS.

RC218C PI-RADS: What Is the Supporting Evidence?

Participants
Hebert Alberto Vargas, MD, New York, NY, (vargasah@mskcc.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the rationale for PI-RADS. 2) Highlight the updates included in PIRADS v2. 3) Discuss the evidence basis for PI-RADS and present the literature highlighting its strengths and limitations.

ABSTRACT

The Prostate Imaging Reporting and Data System (PIRADS), published in 2012, was one of the first well-orchestrated efforts focused on "integration, reporting and communication of multi-parametric prostate MRI". The guideline was updated in 2015 (PIRADS v2) to address some of the limitations of the original version. This session will cover the highlights of PIRADS v2 and discuss the published evidence supporting or questioning the recommendations included in this guideline.

RC220

Imaging Evaluation of Post-Radiation Therapy Normal Tissue Effects

Monday, Nov. 30 8:30AM - 10:00AM Location: S403A

CH GI RO PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Gregory Videtic, MD, FRCPC, Cleveland, OH, (videtig@ccf.org) (*Moderator*) Nothing to Disclose

Sub-Events

RC220A Post-radiation Therapy Lung Imaging

Participants
Gregory Videtic, MD, FRCPC, Cleveland, OH, (videtig@ccf.org) (*Presenter*) Nothing to Disclose
Michelle S. Ginsberg, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review short term and long term changes following radiation therapy. Post SBRT changes will also be reviewed which can differ from more traditional conformal radiotherapy changes. 2) To distinguishing evolving post RT changes from recurrence which is critical in the follow up of these patients. Use of PET/CT in these cases will be discussed.

ABSTRACT

RC220B Post-radiation Therapy Pediatric Body Imaging

Participants
Ralph P. Ermoian, MD, Seattle, WA, (ralphpe@uw.edu) (*Presenter*) Nothing to Disclose
R. Paul Guillerman, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Attendees will be able to list at least one common late body imaging finding associated with radiation treatment for Ewing sarcoma, Hodgkin lymphoma, Wilms tumor and transplant conditioning with total body irradiation. 2) Attendees will be able describe the relationship between dose and target volume in discussing late imaging findings on the musculoskeletal, hepatic and gastrointestinal systems.

ABSTRACT

With the improvement of outcomes of treatment for pediatric cancers, the number of long-term survivors continues to rapidly grow. Although the use of radiation therapy has generally declined over recent decades, it continues to play an essential role in treatment of many children with Wilms tumor, Ewing sarcoma, rhabdomyosarcoma, or Hodgkin lymphoma and some patients undergoing bone marrow transplant for leukemia. Though cured of their disease, long-term survivors often experience late-effects from radiation therapy with accompanying findings on body imaging. The session will describe late effects on multiple organ systems including musculoskeletal, gastrointestinal, and pulmonary, and relate the imaging findings to radiation techniques including dose and radiation fields.

RC220C Post-radiation Therapy Liver Imaging

Participants
Michael I. Lock, MD, FRCPC, London, ON, (michael.lock@lhsc.on.ca) (*Presenter*) Research Consultant, Accuray Incorporated; Speaker, AbbVie Inc
Ashkan A. Malayeri, MD, Bethesda, MD, (ashkan.malayeri@nih.gov) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the current literature on radiological liver changes induced by radiation. 2) Describe the incidence and long-term morphology/natural history of these changes. 3) Apply practical concepts that distinguish recurrence from normal changes in a growing subject area where evidence is just emerging.

ABSTRACT

Primary and secondary liver cancer is becoming a larger proportion of the radiology case load due to increasing incidence and the introduction of new treatment techniques. In particular, new radiotherapy techniques like stereotactic body radiotherapy (SBRT) are being applied routinely for hepatic lesions. However, SBRT induces changes that are difficult to distinguish from local recurrence. Many changes manifest over time and knowledge of the natural history of radiation changes is important. Some changes are transient and others are predictive of critical clinical outcomes. Radiologists are being pressured to provide clinical input as their opinions often result in significant changes in management. These management changes include high risk and expensive treatments. Therefore, we review the literature and provide practical case examples to assist radiologists in a) identifying normal changes b) determining the appropriate investigations with multidisciplinary input c) selecting appropriate predictive parameters for clinically important endpoints such as recurrence.

RC221

Medical Physics 2.0: Radiography

Monday, Nov. 30 8:30AM - 10:00AM Location: S404AB

PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ehsan Samei, PhD, Durham, NC (*Director*) Nothing to Disclose
Douglas E. Pfeiffer, MS, Boulder, CO (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) To gain an appreciation for the broad developments in radiography technology and operation from film to digital, CR to DR, and the implications. 2) To understand the major challenges to optimized radiography that can be addressed by physics input and expertise.

ABSTRACT

Radiography continues to be the mainstay of medical imaging practice worldwide. The last 30 years have witnessed a number of major technological transitions in radiography, in particular from analogue to digital technologies, and from CR to DR. While these and newer advances have addressed a number of prior shortcomings, they have introduced new challenges. Image post-processing, for example, while praised as an asset of digital operation, has often been underutilized and suboptimal. This lecture aims to provide a historical perspective on these topics and to offer topics that worth the focus of the medical physics community.

Sub-Events

RC221A Radiography Perspective

Participants
Ehsan Samei, PhD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC221B Radiography 1.0

Participants
A. Kyle Jones, PhD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the testing philosophies, tests, and foci of current quality control programs in radiography. 2) Understand the motivation and basis for these current foci. 3) Investigate the limitations, shortcomings, and relevancy of these current foci in the modern radiography era.

RC221C Radiography 2.0

Participants
Eric L. Gingold, PhD, Philadelphia, PA, (eric.gingold@jefferson.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the likely changes in medical physics services for radiographic systems over the next 5-10 years. 2) Recognize the value of data logging capabilities of modern digital radiographic systems. 3) Understand how to utilize data to identify quality issues and recommend changes that can improve performance in digital radiography. 4) Understand how to employ modern image performance metrics to analyze image quality and assist facilities in optimizing the capabilities of radiographic systems. 5) Utilize modern process control methods to monitor stability.

ABSTRACT

RC222

MRI: Imaging for Treatment Guidance and Verification

Monday, Nov. 30 8:30AM - 10:00AM Location: S502AB

MR RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

FDA Discussions may include off-label uses.

Participants
Rojano Kashani, Saint Louis, MO (*Moderator*) Investigator, Koninklijke Philips NV; Investigator, ViewRay, Inc

Sub-Events

RC222A In-room MRI for Treatment Guidance

Participants
Rojano Kashani, Saint Louis, MO (*Presenter*) Investigator, Koninklijke Philips NV; Investigator, ViewRay, Inc

LEARNING OBJECTIVES

1) Understand the main concepts of MRI-guided radiation therapy. 2) Understand the advantages and limitations of MRI-guided radiotherapy systems currently in use or under development. 3) Understand the use of in-room MRI guidance for management of intr- and inter-fraction variations in anatomy.

RC222B Integrating MRI, the Clinician Perspective

Participants
Cynthia Menard, MD, Montreal, QC, (cynthia.menard@umontreal.ca) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the clinical benefits associated with the integration of MRI into Radiotherapy. 2) Describe the uncertainties and challenges that exist in MR for radiotherapy.

RC223

Molecular Imaging Mini-Course: Advanced Molecular Imaging

Monday, Nov. 30 8:30AM - 10:00AM Location: E350

MI MR NM PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

Sub-Events

RC223A Novel Tracers

Participants
Timothy R. DeGrado, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the major considerations when developing a novel molecular imaging probe. 2) Compare the strengths and weaknesses of the various imaging modalities with regard to probe development and implementation. 3) Define appropriate experiments for probe validation. 4) Gain an understanding of the process of translation of a probe to clinical practice.

ABSTRACT

Molecular imaging is rapidly advancing as new imaging biomarkers are invented to allow noninvasive assessment of biochemical function. Those who embark on the process of developing novel probes come to know the excitement of imaging biological processes for the first time, but are also well aware of the great effort and many pitfalls that can impede progress. This introductory lecture will provide an overview of the process of molecular imaging probe conception, development, preclinical validation, and translation. Specific examples will be used to illustrate the presenter's experience with meeting these challenges.

RC223B Novel Instrumentation (PET/MR)

Participants
Ciprian Catana, MD, PhD, Charlestown, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Distinguish the technical approaches that have been proposed for integrating PET and MRI for the purpose of simultaneous data acquisition. 2) Evaluate the latest methodological developments in PET/MRI for improving PET data quantification. 3) Incorporate simultaneous PET/MRI techniques into research and clinical projects.

ABSTRACT

RC223C Molecular Imaging with MR

Participants
Bruce R. Rosen, MD, PhD, Charlestown, MA, (bruce@nmr.mgh.harvard.edu) (*Presenter*) Research Consultant, Siemens AG

RC224

Understanding and Using the STARD (Standards for Reporting Diagnostic Accuracy Studies) and PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Guidelines

Monday, Nov. 30 8:30AM - 10:00AM Location: E352

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Herbert Y. Kressel, MD, Boston, MA (*Moderator*) Royalties, Bayer AG
Herbert Y. Kressel, MD, Boston, MA (*Presenter*) Royalties, Bayer AG
Deborah Levine, MD, Boston, MA, (dlevine@rsna.org) (*Presenter*) Editor with royalties, UpToDate, Inc; Editor with royalties, Reed Elsevier;
Patrick M. Bossuyt, PhD, Amsterdam, Netherlands (*Presenter*) Nothing to Disclose
Matthew D. McInnes, MD, FRCPC, Ottawa, ON, (mmcinnes@toh.on.ca) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1)To familiarize attendees with reasons for why quality improvement initiatives are important for the dissemination of published research. 2) To discuss the components of the STARD criteria and why these are important for studies of diagnostic accuracy. 3) To describe the PRISMA statement and why these make up key components of high quality systematic reviews. 4) To enable authors to improve completeness of reporting in their submitted manuscripts, to demonstrate study quality and thus enhance the liklihood that their manuscripts will be favorably reviewed when submitted to journals for publication.

ABSTRACT

The purpose of this session is to describe STARD and PRISMA, two documents that aim to improve scientific study quality by improving reporting. The Editor of Radiology, Dr. Herbert Kressel, Professor Radiology at Harvard Medical School, will introduce the importance of quality metrics in scientific research. Dr. Patrick Bossuyt, Professor of Clinical Epidemiology at University of Amsterdam, and one of the original authors of the STARD manuscript who is currently working to revise STARD, will discuss the components of the STARD criteria and why these are important for studies of diagnostic accuracy. Dr. Matthew McInnes, Associate Professor of Radiology at University of Ottawa, and our 2014 Eyler Editorial fellow will describe the PRISMA statement and the important key components of high quality systematic reviews. Dr. Deborah Levine, Professor of Radology at Harvard Medical School and the Senior Deputy Editor of Radiology will describe how to put all of this information together into your final study plan and written manuscript. Our goal is to enable authors to improve completeness of reporting in their submitted manuscripts, to demonstrate study quality and thus enhance the liklihood that their manuscripts will be favorably reviewed when submitted for publication. Please see our publication information for authors at : http://pubs.rsna.org/page/radiology/pia.

RC225

Physics Series: Quantitative Imaging Mini-Course: Image Modality Specific Issues

Monday, Nov. 30 8:30AM - 12:00PM Location: S403B

BQ CT MR NM PH

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

FDA Discussions may include off-label uses.

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Director*) Institutional research agreement, Siemens AG; Research support, Siemens AG; ; ; ; ;
Edward F. Jackson, PhD, Madison, WI, (efjackson@wisc.edu) (*Moderator*) Nothing to Disclose
Paul L. Carson, PhD, Ann Arbor, MI (*Moderator*) Research collaboration, General Electric Company; Research collaboration, Light Age, Inc

Sub-Events

RC225-01 Quantitative Imaging for Computed Tomography: Applications and Future Directions

Monday, Nov. 30 8:30AM - 9:00AM Location: S403B

Participants
Samuel G. Armato III, PhD, Chicago, IL, (s-armato@uchicago.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the role of computed-tomography-based quantitative imaging in the clinical and research settings.

ABSTRACT

RC225-02 Quantification of Vascular Response in Rodent Brown Adipose Tissue Using Spectral CT

Monday, Nov. 30 9:00AM - 9:10AM Location: S403B

Participants
Xin-Gui Peng, MD,PhD, Nanjing, China (*Presenter*) Nothing to Disclose
Zhen Zhao, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Di Chang, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Shenghong Ju, MD, PhD, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Brown adipose tissure (BAT) has abundant mitochondrion, uncoupling protein 1 and vascularizaiton to provide sufficient energy compared to white adipose tissure (WAT). Our study is to assess the changes of iodine/water base material concentration in BAT after injecting norepinephrine (NE).

METHOD AND MATERIALS

The animal study was approved by the institutional Committee on Animal Research. Spetral CT scan (GE, Discovery CT750) was performed to measure the iodine/water concentration based on base material mapping in the BAT (interscapular) and WAT (visceral) of Wistar rat (n=6, 14 weeks, 304g±12g) at baseline condition. To induce the blood flow increase, animals were given NE (1μg/kg/min, 10min, totle 1ml) or saline (1ml) from caudal vein. The enhanced CT imaging (6ml/kg, iopromide 300) was performed after the injection of the drug. The iodine/water concentraction of BAT and WAT, the BAT/Arota and WAT/Arota ratio were calculated. Statistical analysis was performed with independent sample t test and paired sample t test .

RESULTS

There was no difference in mean base iodine (water) material concentration of BAT and WAT at the baseline condition between the NE and saline groups (P>0.05). After injecting NE, the base iodine material concentration of BAT increased significantly compared to controls (NE: -5.41±1.20mg/cm3 and 23.57±8.71mg/cm3; saline: -7.66±2.01mg/cm3 and 8.71±3.68mg/cm3, respectively; P<0.001) (Fig.A). However, there were no statistically significant changes observed in iodine and water material concentration of WAT between both groups. The BAT/Arota ratio, WAT/Arota ratio of iodine concentration and BAT/Arota ratio of water concentration after injection NE increased significantly (iodine: BAT/Arota ratio, 0.26±0.96 and 0.10±0.04, WAT/Arota ratio, -0.12±0.04 and -0.16±0.03; water: BAT/Arota ratio:1.06±0.02 and 0.93±0.04, respectively; P<0.001) (Fig.B). There was no difference of WAT/Arota ratio in water concentration imaging between both groups (P>0.05) (Fig.C).

CONCLUSION

The iodine/water base material concentration detected the pharmacologic activation of BAT. Energy spectrum CT has protential to evaluate the change of BAT and WAT after treatment.

CLINICAL RELEVANCE/APPLICATION

Spectral CT provided a new noninvasive method to be translated to a clinical setting for evaluation the difference of adipose tissue and monitoring the responses to specific therapeutic strategies.

RC225-03 Determinants of the Accuracy of the Quantification of Glandularity and Iodine Uptake in Contrast-Enhanced Digital Mammography

Monday, Nov. 30 9:10AM - 9:20AM Location: S403B

Participants
Kristen C. Lau, MS, Philadelphia, PA (*Presenter*) Nothing to Disclose
Moez K. Aziz, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Young Joon Kwon, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Andrew D. Maidment, PhD, Philadelphia, PA (*Abstract Co-Author*) Research support, Hologic, Inc; Research support, Barco nv; Spouse, Employee, Real-Time Radiography, Inc; Spouse, Stockholder, Real-Time Radiography, Inc

PURPOSE

To develop a method for determining breast tissue composition in dual-energy (DE) contrast-enhanced digital mammography (CE-DM). The motivation for this arises from our difficulty to resolve contrast uptake at the boundaries of the breast in DE subtraction.

METHOD AND MATERIALS

Phantoms were constructed using 1 cm thick uniform blocks of 100% glandular-equivalent and 100% adipose-equivalent materials (CIRS, Norfolk, VA). The thickness of the phantoms ranged from 3 to 8 cm, in 1 cm increments. For a given thickness, the glandular/adipose composition of the phantom was varied using different combinations of blocks. The phantoms were imaged using a prototype DE Hologic Selenia Dimensions DBT system. A 0.3 mm copper filter is used for the high-energy (HE) x-rays (49 kVp) and a 0.7 mm aluminum filter is used for the low-energy (LE) x-rays (32 kVp). X-ray energies were chosen so the k-edge of the contrast agent was in the range spanned by the LE and HE x-ray spectra. DE images were obtained by a weighted logarithmic subtraction of the HE and LE image pairs. The images were smoothed using a 2D convolution with a 4x4 matrix prior to quantitative analysis. LE and HE signal intensities were normalized by the mAs, and mean and standard deviation values were calculated for the normalized log HE and log LE images.

RESULTS

The mean LE and HE values varied with phantom thickness and glandularity. The log LE and log HE signals decrease linearly with increasing glandularity for a given thickness. The signals decrease with increasing phantom thickness; for a given glandularity, the x-ray signal decreases linearly with thickness. As the thickness increases, the attenuation difference per additional glandular block decreases, indicating beam hardening. Using these data, we have created a mapping between signal intensity and breast thickness. These data facilitate the subtraction of tissue in the periphery of the breast, and aid in discriminating between contrast agent uptake in glandular tissue and subtraction artifacts.

CONCLUSION

We have shown that breast thickness and composition can be predicted based on signal intensities in DE CE-DM. This has implications for the weighting factor used in DE subtraction.

CLINICAL RELEVANCE/APPLICATION

DE CE-DM can be improved by taking into account breast thickness and composition. Combining these techniques into a single procedure is a powerful tool for the detection and diagnosis of breast cancer.

RC225-04 Mapping of Medullar Adiposity of the Lumbar Spine in MRI

Monday, Nov. 30 9:20AM - 9:30AM Location: S403B

Participants
Nicolas Demany, Brest, France (*Abstract Co-Author*) Nothing to Disclose
Julien Ognard, MD, MSc, Brest, France (*Presenter*) Nothing to Disclose
Jawad Mesrar, MD, Brest, France (*Abstract Co-Author*) Nothing to Disclose
Serge Ludwig Aho-Glele, Dijon, France (*Abstract Co-Author*) Nothing to Disclose
Alain Saraux, Brest, France (*Abstract Co-Author*) Nothing to Disclose
Douraied Ben Salem, MD, PhD, Brest, France (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The bone medullar adiposity is a marker of bone quality to the point that it should be better to know the factors which influence or not the density and distribution of this fat in the spine, especially at the lumbar level.

METHOD AND MATERIALS

A sagittal sequence IDEAL IQ (MRI GE 1.5T) was performed on the lumbar spine of 46 subjects without bone disease (21 women and 25 men, aged 18 to 77 years old). Medulla adiposity was determined directly from the measurement of the fat fraction of each vertebral body (T12 to S1) obtained on the fat cartography automatically generated by the IDEAL sequence.

RESULTS

Average vertebral fat fraction was 36.48% (DS 12.82 ; 14.69% - 72.8%], increasing with age, and it is higher among men. We observed a craniocaudal gradient of the fat fraction (B = 1,37 ; p < 0,001 ; DS 0,06) increasing with age in the lumbar spine from T12 to L5. Through a multivariate analysis, this gradient was independent of sex, weight and height of subjects.

CONCLUSION

This study shows the existence of a physiological craniocaudal gradient of vertebral medullar adiposity from T12 to L5. This gradient increases with age but it is independent of sex or BMI. The IDEAL sequence allows quick and reproducible measurement of the spine vertebral medullar adiposity.

CLINICAL RELEVANCE/APPLICATION

IDEAL IQ is a Rapid sequence, Allowing easy and reproducible measurements with ROIs. The need is to recruit a wider population to establish standards fat percentage by age strata and compare them with bone mineral density obtained by densitometry. For example, in an attempt to establish thresholds for a subject to beconsidered as osteopenic or osteoporotic. The IDEAL IQ sequence allows a fast and reproductible measure of the bone marrow fat of the spine, that could easily completing a lumbar MRI assessment

RC225-05 Automatic Quantification of Iodine and Calcium using Monoenergetic Virtual Images Generated by

Spectral Detector Dual-Layer CT: A Phantom Study

Monday, Nov. 30 9:30AM - 9:40AM Location: S403B

Participants
Isaac Leichter, PhD, Jerusalem, Israel (*Presenter*) Nothing to Disclose
Tzvi Lipschuetz, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose
Tzvi Vichter, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose
Zimam Romman, Haifa, Israel (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Jacob Sosna, MD, Jerusalem, Israel (*Abstract Co-Author*) Consultant, ActiViews Ltd Research Grant, Koninklijke Philips NV

PURPOSE

To use Monoenergetic Virtual images generated by Spectral Detector Dual-Layer CT (SDCT) for automatic reliable identification and concentration calculation of calcium and iodine solutions.

METHOD AND MATERIALS

Tubes of 11.1 mm diameter filled with iodine and calcium solutions at concentrations of 10 to 60 mg/ml and 100 to 1000 mg/ml, respectively, were inserted in a water-equivalent anthropomorphic CT phantom (QRM, Moehrendorf, Germany). The phantom, of two sizes (25×35 cm and 30×40 cm), was scanned with a SDCT (Philips Healthcare, Cleveland, OH, USA) at 120kVp and 200 mAs. Software was developed to calculate the relationship between gray-level values of pixels containing iodine and calcium solutions in the monoenergetic virtual images generated by SDCT. The relationship obtained for the image of the small phantom was used to create spectral maps that uniquely characterize the material in the pixel, independently of its concentration. For any given image, the software searched and identified pixels which fitted into the spectral map equations of calcium and iodine and displayed them in different colors. In order to evaluate the effect of beam hardening, iodine and calcium was searched in images of both phantom sizes. The concentration of each solution identified by the software was evaluated.

RESULTS

In the small phantom (98.9±1.6)% of the pixels containing iodine or calcium were correctly identified and displayed in different colors. In the large phantom the identification accuracy was (92.7±10.4)%. The calculated solution concentrations in the small phantom were higher by (4.6±2.6)% from the actual concentrations, and lower by (5.7±4.6)% in the large phantom.

CONCLUSION

SDCT can differentiate between calcium and iodine solutions in a phantom model and calculate their concentrations with good accuracy on a pixel by pixel analysis. Beam hardening effects had only a small impact on the results which depended very slightly on the phantom size or the solution location within the phantom.

CLINICAL RELEVANCE/APPLICATION

By the use of Spectral Detector CT, contrast agents in blood and tumors may be reliably differentiated from adjacent skeletal components, and their concentration can be accurately assessed.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Jacob Sosna, MD - 2012 Honored Educator

RC225-06 Quantitative Imaging for PET-CT: Applications and Future Directions

Monday, Nov. 30 9:40AM - 10:10AM Location: S403B

Participants
Robert Jeraj, Madison, WI (*Abstract Co-Author*) Founder, AIQ Services
Tyler Bradshaw, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the role of PET/CT-based quantitative imaging in the clinical and research settings.

RC225-07 Quantitative Imaging for DCE-MRI: Applications and Future Directions

Monday, Nov. 30 10:25AM - 10:55AM Location: S403B

Participants
Yue Cao, PhD, Ann Arbor, MI (*Presenter*) Research Grant, Siemens AG; Speaker, Siemens AG

LEARNING OBJECTIVES

1) Describe the role of quantitative DCE MR imaging in the clinical and research settings.

RC225-08 Measuring Blood Velocity with Doppler-CT (part 1): Theoretical Aspects and Simulations

Monday, Nov. 30 10:55AM - 11:05AM Location: S403B

Participants
Johannes G. Korporaal, PhD, Forchheim, Germany (*Abstract Co-Author*) Employee, Siemens AG
Rainer Raupach, PhD, Forchheim, Germany (*Abstract Co-Author*) Employee, Siemens AG
Thomas G. Flohr, PhD, Forchheim, Germany (*Abstract Co-Author*) Employee, Siemens AG
Bernhard Schmidt, PhD, Forchheim, Germany (*Presenter*) Employee, Siemens AG

PURPOSE

Measuring blood velocity with computed tomography (CT) has been subject of numerous studies, most of which used the time-of-flight technique. With that method, data acquisition should be performed with a stationary table (sequence mode) and the clinical applicability and measurement accuracy are limited by the detector size. The purpose of this study is to introduce Doppler-CT as a new method of measuring blood velocity by describing the theory, simulating its expected behavior and deriving clinical acquisition strategies.

METHOD AND MATERIALS

In general, the speed v [m/s] of a wave with wavelength λ [m] and frequency f [1/s] is given by $v = f*\lambda$. When considering a straight vessel segment and assuming a linear increase in contrast enhancement after injecting an iodinated contrast agent, the blood velocity can be analogously calculated from the spatial [m/HU] and temporal [HU/s] contrast gradients within the vessel. In case the observer O (the scan plane of the CT scanner) and the source S (the human heart) are moving with respect to each other, i.e. during a spiral acquisition, the well-known Doppler-equations can be applied, e.g. $fO = fS(1 \pm v/c)$ [eq.1], with fO being the measured temporal gradient [HU/s] of the spiral scan, fS the temporal gradient [HU/s] produced by the heart, ±v the table speed and c the blood velocity. For table velocities of ±70cm/s and blood velocities of ±100cm/s, fO was simulated as fraction of fS, since the relative change in fO is independent of fS.

RESULTS

With a known direction of table movement, the direction of the blood flow can be qualitatively determined, since the relative gradient of fO is centrally symmetric. With increasing table speed and decreasing blood speed, the deviation of fO from fS increases, indicating better quantitative measurement accuracy. For equal image noise, low tube voltages and high iodine delivery rates will further improve the measurement sensitivity.

CONCLUSION

High table speed and low blood velocity are favorable for quantifying blood velocity with Doppler-CT. Implementation in clinical routine can be simple, e.g. with two (or more) sweeps of a dynamic scan mode with alternating scan direction (part 2) or with a bolus tracking scan followed by a CT angiography (part 3).

CLINICAL RELEVANCE/APPLICATION

Measuring blood velocity is no longer reserved for wide-detector CT-systems in sequence mode, but can also be performed with CT-systems with smaller detectors in spiral scan mode.

RC225-09 Quantification of Hepatic Tumor Viability in Multi-phase MDCT Images

Monday, Nov. 30 11:05AM - 11:15AM Location: S403B

Participants
Wenli Cai, PhD, Boston, MA (*Presenter*) Nothing to Disclose
Anand K. Singh, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Yin Wu, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Gordon J. Harris, PhD, Boston, MA (*Abstract Co-Author*) Medical Advisory Board, Fovia, Inc

PURPOSE

The purpose of this study was to develop a quantitative imaging biomarker, denoted as hepatic tumor viability (HTV), for quantification of viable and necrotic tumor volumes in addition to the size of liver and tumors in the assessment of tumor progression and treatment responses for patients with hepatocellular carcinoma (HCC) and metastasis.

METHOD AND MATERIALS

Based on the pattern analysis of time-intensity curve (TIC) in multi-phase MDCT images, we developed the automated HTV scheme for segmentation of liver and liver tumors, and classification of viable and necrotic tumor regions. To depict a TIC pattern, a group of TIC features was extracted including the peak CT value, the time to peak (TTP), the area under the curve (AUC), the AUC of wash-in/out, the max/average wash-in/out derivative, and a group of spatiotemporal textures: skewness, kurtosis, energy, and entropy. A K-mean cluster was applied to classify each voxels into four different types of materials: vessel, normal liver tissue, tumor tissue, and necrotic tissue. Liver, liver tumor and viable regions were segmented using the likelihood to each material. Forty (40) IV-contrast enhanced hepatic multi-phase MDCT cases with biopsy-confirmed HCC or metastases were used for evaluation of the proposed HTV biomarker. The MDCT imaging parameters settings were: 2.5-5 mm collimation, 1.25-2.5 mm reconstruction interval, 175 mA tube current, and 120 kVp tube voltage.

RESULTS

In reference to the liver and tumor segmentation by manual-contouring of two radiologists, the volumetric size of these 40 HCC or metastasis livers ranged from 1079.2 CC to 4652.3 CC, in which the tumor volume percentages ranged from 1.77% to 53.54%. The proposed HTV scheme achieved a liver volumetric difference of 3.27±2.58% and tumor percentage difference of 1.33±1.44%. Viable tumor volume showed significant better performance than RECIST and total tumor volume in prediction of treatment response in the case of overall and progression-free survival.

CONCLUSION

Our HTV biomarker can achieve accurate and reliable quantification results in segmentation of liver and liver tumors, classification of viable and necrotic tumor regions, and thus provides a better prediction of treatment response.

CLINICAL RELEVANCE/APPLICATION

Our HTV biomarker can provide an accurate and reliable tumor quantification for assessment of tumor progression and treatment response for HCC and liver metastasis.

RC225-10 Fully Automated Quantitative Analysis of Myocardial Perfusion in First-pass MR Images

Monday, Nov. 30 11:15AM - 11:25AM Location: S403B

Participants
Luan Jiang, PhD, Shanghai, China (*Presenter*) Nothing to Disclose
Shan Ling, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Jichao Yan, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Qiang Li, PhD, Shanghai, China (*Abstract Co-Author*) Patent agreement, General Electric Company Patent agreement, Hologic, Inc Patent agreement, Riverain Technologies, LLC Patent agreement, MEDIAN Technologies Patent agreement, Mitsubishi Corporation

PURPOSE

We are developing a fully automated scheme for quantitative analysis of myocardial perfusion in short-axis first-pass MR images.

METHOD AND MATERIALS

We obtained 8 short-axis myocardial perfusion MR scans from xxx Hospital in xxx with an xxx 1.5-T MR scanner. Each MR scan has 40 time frames with slice thickness 8 mm and in-plane resolution 1.37 mm × 1.37 mm. Our automated method consists of three steps, i.e., cardiac registration, myocardium segmentation, and empirical indexes quantification. Based on the region of interest (ROI) automatically identified from the image at the reference time phase with better contrast of left ventricle and myocardium, a multiscale affine transformation using Sobel gradient information and a non-rigid Demons registration using pseudo ground truth images were sequentially applied to correct the deformations caused by respiratory and cardiac motion. We then further used fuzzy c-means clustering method in the reference image and dynamic programming method in the maximum intensity projection image of all time phases to delineate, respectively, the endo- and epicardial boundaries of the myocardium. Finally, several empirical perfusion indexes (peak signal intensity, time to peak, and maximum upslope) were quantified from the time-intensity curves of segments of myocardium.

RESULTS

Dice index based on apical, midventricular, and basal slices was improved from 78.4% ± 12.5% to 85.9% ± 5.3% using cardiac registration, and Dice index of 82.2% ± 5.9% was achieved for myocardium segmentation. Subjective judgment showed that the empirical indexes were able to identify the ischemia in myocardium.

CONCLUSION

Our fully automated scheme for quantitative analysis of myocardial perfusion MR images would be useful for myocardium perfusion assessment and early diagnosis of myocardium with ischemia.

CLINICAL RELEVANCE/APPLICATION

Our CAD scheme could help the radiologists to quantitatively analyze myocardium perfusion and to improve the accuracy and efficiency for diagnosis of myocardium with ischemia.

Active Handout:Luan Jiang

http://abstract.rsna.org/uploads/2015/15016295/RC225-10.pdf

RC225-11 Laws Textures: A Potential MRI Surrogate Marker of Hepatic Fibrosis in a Murine Model

Monday, Nov. 30 11:25AM - 11:35AM Location: S403B

Participants
Baojun Li, PhD, Boston, MA (*Presenter*) Nothing to Disclose
Hei Shun Yu, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Hernan Jara, PhD, Belmont, MA (*Abstract Co-Author*) Patent holder, qMRI algorithms Research Grant, General Electric Company Royalties, World Scientific Publishing Co
Jorge A. Soto, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Stephan W. Anderson, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To study the effect of disease progression on liver parenchymal Laws textures of ex vivo murine liver specimens imaged using 11.7 Tesla MRI. To compare Laws textures to other imaging-based surrogate markers (T2, PD, ADC, and degrees of inflammation).

METHOD AND MATERIALS

This animal study was IACUC approved. Seventeen male, C57BL/6 mice were divided into control (n=2) and experimental groups (n=15). The latter were fed a 3,5-dicarbethoxy-1, 4-dihydrocollidine (DDC) supplemented diet to induce hepatic fibrosis. Ex vivo liver specimens were imaged using an 11.7T MRI scanner, from which the parametric proton density (PD), T2, and ADC maps were generated from spin-echo pulsed field gradient and multi-echo spin-echo acquisitions. The PD maps were first preprocessed to eliminate the low-intensity histogram bias arisen from partial volume effect. The PD maps were further corrected by mean and standard deviation in order to minimize discrimination by overall graylevel variation, which is unrelated to liver parenchymal texture. Laws textures were extracted from the PD maps. Degrees of fibrosis and inflammation were assessed by an experienced pathologist (subjective scores) and digital image analysis (DIA, %Area Fibrosis). Scatterplot graphs comparing Laws texture, T2, PD, ADC, inflammation score to degrees of fibrosis were generated and correlation coefficients were calculated.

RESULTS

Hepatic fibrosis and Laws textures were strongly correlated with higher %Area Fibrosis associated with higher Laws textures ($r=0.89$, $p<0.001$). Strong correlation also existed between T2 and Laws textures ($r=0.85$, $p<0.01$). Moderate correlations were seen between %Area Fibrosis and PD ($r=0.65$), ADC ($r=0.67$), and Subjective Fibrosis Score ($r=0.51$). The Subjective Inflammation Score was poorly correlated with hepatic fibrosis ($r=0.20$). Without proposed corrections, there was only a moderate correlation between %Area Fibrosis and Laws textures ($r=0.70$).

CONCLUSION

Higher degree of hepatic fibrosis is associated with increased liver parenchymal Laws textures. Laws textures may be more accurate than PD, ADC, and subjective fibrosis and inflammation scores in assessing degrees of fibrosis. The proposed corrections are critical.

CLINICAL RELEVANCE/APPLICATION

Laws textures are potentially accurate surrogate marker for diagnosing and staging hepatic fibrosis.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Hernan Jara, PhD - 2014 Honored Educator
Jorge A. Soto, MD - 2013 Honored Educator
Jorge A. Soto, MD - 2014 Honored Educator
Jorge A. Soto, MD - 2015 Honored Educator

RC225-12 Grading of Diffuse Liver Diseases Using Phase-Contrast-Imaging

Monday, Nov. 30 11:35AM - 11:45AM Location: S403B

Participants
Marco Armbruster, Munich, Germany (*Presenter*) Co-Founder of medical software company.
Blaz Zupanc, MA, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Emmanuel Brun, Grenoble, France (*Abstract Co-Author*) Nothing to Disclose
Alberto Mittone, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Wieland H. Sommer, MD, Munich, Germany (*Abstract Co-Author*) Founder, QMedify GmbH
Wolfgang Thasler, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Maximilian F. Reiser, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Paola Coan, Grenoble, France (*Abstract Co-Author*) Nothing to Disclose

CONCLUSION

X-ray PCI allows grading of diffuse liver diseases, is correlated to histopathology and might be a valuable technique for non-invasive diagnosis and grading of liver fibrosis and steatosis.

Background

Diffuse liver pathologies like steatosis, fibrosis or cirrhosis are an increasing cause of morbidity and mortality worldwide. Liver biopsy is currently the gold standard for the diagnosis and monitoring of disease progression and is essential both for treatment decisions and the prognosis of patients. However, liver biopsy has non-negligible risks, is prone to sampling erros and cannot be used as a screening method.Therefore, the purpose of this study was a proof-of-concept that high resolution X-ray phase contrast imaging (PCI) in computer tomography mode is able to directly visualize pathological changes of the microstructure and that grading of diffuse liver diseases is feasible using PCI-CT.

Evaluation

Synchrotron-based PCI-CT volumetric imaging was performed for human, ex-vivo liver samples from 20 patients (male: 12, female: 8, age: 62+-12 yrs). Histopathological workup included hematoxylin-and-eosin-, elastica-van-Gieson-, and iron-straining. For PCI-CT, propagation based imaging technique was used with X-ray of 30 keV and a sample-to-detector distance of 11m. Images were acquired at a spatial resolution of 8 microns.All dataset were graded for the presence of fibrotic changes and the amount of fatty vacuoles. PCI-CT- and histopathological grading of fibrosis and steatosis was correlated using pearson's correlation-coefficient. Both fatty vacuoles, portal, and septal fibrougenous deposites were identifiable in PCI-CT. Visual grading of fibrosis and steatosis correlated moderatly but significantly to the histopathological assessment ($r=0.682$; $p<0.05$ for fibrosis; $r=0.764$; $p<0.05$ for steatosis).

Discussion

In this study we used X-ray PCI for a direct visualization of microstructural changes within the liver tissue of patients suffering from diffuse liver diseases. Detailed grading of fibrosis and steatosis was feasible. Due to the three-dimensionality of PCI datasets this technique has the potential to decrease interobserver variability and sampling errors in the grading of diffuse liver diseases.

RC225-13 Question and Answer

Monday, Nov. 30 11:45AM - 12:00PM Location: S403B

Participants

RC227

Lasting Cultural Shift - Platitudes to Attitudes: Roundtable with ACR Leaders

Monday, Nov. 30 8:30AM - 10:00AM Location: E260

HP LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Bibb Allen JR, MD, Birmingham, AL (*Coordinator*) Nothing to Disclose
Bibb Allen JR, MD, Birmingham, AL (*Moderator*) Nothing to Disclose

ABSTRACT

Because of changing federal policy and reimbursement models, the next five years may be the most tumultuous for medicine and our specialty since the adoption of Medicare. Leaders in organized radiology are working to place our specialty in the best possible position, but we face complex issues requiring complex and potentially counterintuitive solutions. Strategic decisions made by our organizations need to be informed by and have buy-in from those in the trenches of clinical practice. The imperatives of health reform and the dynamic shift from volume based transactional care to value based population care are creating the critical issues facing our specialty. In this roundtable session, we discuss a number of the critical issues facing our practices and discuss proactive strategic initiatives that can empower radiologists to transition from volume based to value based care and position their practices to succeed in the new paradigm. While integral to providing optimal radiological care, the value of the interpretations we provide will ultimately be taken for granted by our systems and policy makers. In order to provide additional value we must look beyond just the value of our interpretations. By engaging in the care prior to and following image interpretation, radiologists can improve individual patients' safety, outcomes and engagement as well as improve population health. This measurable role for radiology in providing cost effective care will increase our relevance to the healthcare system beyond image interpretation. Participants can share their ideas and concerns with leaders in organized radiology as well as take away a number of tools they can use in their practices to begin or enhance the shift to value based care. Using these strategies, radiologists can leverage the value they create to enhance their position in their health systems and your professional organizations can leverage that same value with policy makers to impact federal health policy.

Sub-Events

RC227A Awareness to Accountability: Coping with the Mandates for Documenting Higher-Value Care

Participants
Bibb Allen JR, MD, Birmingham, AL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the economic, political and practice issues facing our specialty. 2) Analyze the federal policy, private payer, health system and consumer initiatives that are signaling the shift toward value-driven care and reimbursement models. 3) Review organized radiology's efforts to raise awareness and promote culture change among radiologists to adapt to the mandates of health reform. 4) Discuss organized radiology's role in empowering radiologists to document the delivery of higher value care through metrics development, policy maker engagement, and data collection/registry development for reporting quality data to policy makers and certification bodies. 5) Examine how registry reporting can enable socioeconomic researchers to assess ways imaging can improve outcomes.

ABSTRACT

Health and Human Services Secretary Sylvia Burwell along with the US Congress have set ambitious targets for value-based payments in the US Medicare program with the goal of tying 85% of Medicare fee-for-service payments to quality or value metrics by 2016. Raising awareness will not be enough to achieve a lasting cultural shift required to cope with these mandates. Empowering radiologists to transition from volume based to value based care and position their practices requires development of meaningful metrics specific to radiology for quality reporting is essential and developing tools to capture this meaningful information as part of our daily workflow is requisite for efficient practice. By standardizing these metrics we have an opportunity for national registry reporting, which offers not only opportunity for internal process improvement but also benchmarking for government agencies to be used for quality reporting in the Physician Quality Reporting System (PQRS) and potentially by American Board Radiology for meeting Practice Quality Improvement (PQI) requirements for Maintenance of Certification (MOC). The goal is for radiologists to seamlessly participate in PQRS and potentially PQI and MOC by automatically reporting their metrics to the registries and monitoring their dashboards for areas that need improvement. Additionally, registry reporting allows data mining that will support future socioeconomic research in radiology, so that we can learn where there are opportunities for further improvement in the care of our patients and cost efficiencies.

RC227B Providing Higher-Value Care through Population Health Management: What Is the Radiologist's Role?

Participants
James A. Brink, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Examine current trends and mandates for physician involvement in population health management. 2) Explain the differences and synergies between population health management and the art of medical practice. 3) Discuss the value radiologists can bring to population health management and how this role will become an important resource for their health systems. 4) Identify the tools radiologists can use in their practices to be effective in population health management by reducing variation in radiological care. 5) Discuss the role of precision and personalized medicine in population health management.

ABSTRACT

Specialists may leverage several strategies when seeking to manage population health. For radiologists, reducing variation in the

Specialists may leverage several strategies when seeking to manage population health. For radiologists, reducing variation in the imaging examinations that we recommend and how we report key findings has the potential to support more uniform and appropriate care at the population level. Under-utilization of medical imaging risks decrements in the health of our population while over-utilization leads to increased cost and heightened morbidity from unnecessary follow-on imaging and interventional procedures. Moreover, increased precision in the quantitative nature of our reports promises to yield more effective treatments as therapies are personalized to precise patient phenotypes and disease states. Appropriateness criteria and referral guidelines take the guesswork out of which tests to recommend, and imaging-based care algorithms narrow the range of recommendations that referrers may receive in response to a clinical imaging scenario. However, such changes to our practice threaten the 'art of medicine' where intuition plays an important role in establishing diagnoses and understanding disease severity. Art can take many forms, and the transition from personal impression to consensus and fact-based conclusion in the tests we recommend and the reports that we generate mirror the transition from abstract art to photorealism. The increase in precision does not make 'art' any less artistic; rather, it is simply based on a different set of principles.

RC227C Involving Patients in Their Radiological Care: Radiologist Visibility, Personalized Care and Improving Outcomes

Participants
Geraldine B. McGinty, MD,MBA, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the ways radiologists can enhance patients' experiences throughout the continuum of radiological care. 2) Identify tools and resources for patient education regarding their radiological care. 3) Describe the current mandates for patient access to medical records and discuss ways for effective communication between radiologists and patients. 4) Leverage the value of patient-centered radiological care as a resource for health systems. 5) Identify ways to improve patient outcomes through effective communication.

ABSTRACT

Reform of the healthcare delivery system has as a stated goal the so-called "Triple Aim": to reduce costs while improving both population health as well as the individual experience of care. For radiologists, many of whom do not typically meet the patients whose images they interpret, this represents both a challenge as well as a significant opportunity. Across the continuum of imaging care delivery there are points at which radiologists can engage patients to improve not only the patient's level of satisfaction but also their eventual outcome. For example a patient who understands the nature of the imaging test they will undergo is more likely to be able to cooperate in the process of making sure the images are of the highest diagnostic quality. We will review the resources available to radiologists to support them in engaging their patients at each step of the imaging care process. We will focus on disruptive innovations around direct communication of results to patients and sharing of images and discuss how payment models and regulations are fuelling these changes. We will also highlight how providing a more patient-centered imaging care experience will align radiologists with a value based approach to healthcare delivery providing opportunities to demonstrate the value that imaging provides to stakeholders both internal such as health system administration and external such as payers.

RC229

Rectal Carcinoma: Pre and Post Treatment Evaluation with MRI (An Interactive Session)

Monday, Nov. 30 8:30AM - 10:00AM Location: E353B

GI MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC229A Rectal Carcinoma: Setting the Stage, What the Clinician Needs to Know

Participants
Gina Brown, MD, MBBS, Sutton, United Kingdom, (gina.brown@rmh.nhs.uk) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the prognostic relevance of MRI in planning surgical treatment options. 2) MRI assessment for oncologic treatment decisions. 3) Future developments in treatment strategies based on MRI assessment and restaging after chemoradiotherapy.

Handout:Gina Brown

http://abstract.rsna.org/uploads/2015/15002789/RSNA2015_GinaBrownHandout.pdf

RC229B Pre Treatment Staging Standardized Reporting: Have you Checked the 'DISTANCE?'

Participants
Caroline Reinhold, MD, MSc, Montreal, QC, (caroline.reinhold@mcgill.ca) (*Presenter*) Consultant, GlaxoSmithKline plc

LEARNING OBJECTIVES

1) To propose a MR imaging protocol for staging newly diagnosed rectal carcinoma.2) To understand the anatomy of the rectum and mesorectum as pertains to MRI staging.2) To propose a step-by-step approach for standardized MRI staging of pre-treatment rectal carcinoma using the mnemonic "DISTANCE".

ABSTRACT

In the Western Hemisphere, colorectal cancer is the third most common cancer in men after prostate and lung, and the second most common in women after breast cancer. One-third of colorectal cancers occur in the rectum. Survival rates for rectal cancer have improved in the past decade due to the combined effects of better staging, improved preoperative treatment strategies and total mesorectal excision (TME) surgery. Several studies have been published showing the ability of MRI to accurately stage rectal cancer and predict a negative circumferential resection margin. Moreover, advances in preoperative therapies require accurate preoperative MRI staging to select those patients who may benefit from chemoradiation prior to surgery. To accurately stratify patients according to the risk of local and distant failure, imaging takes on the same importance as tumor type and genetic susceptibility. However, rectal cancer evaluation by MRI continues to pose a challenge in non experts' hands. This presentation will present a mnemonic: "DISTANCE" to enable a systematic and standardized approach to the interpretation of MR imaging in newly diagnosed rectal cancers, thereby enabling all the clinically relevant features to be adequately assessed: DIS: for Distance from the Inferior part of the tumor to the transitional Skin, T: for T staging, A: for Anal complex, N: for Nodal staging, C: for Circumferential Resection Margin, E: for Extramural vascular invasion.

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Caroline Reinhold, MD, MSc - 2013 Honored Educator
Caroline Reinhold, MD, MSc - 2014 Honored Educator

RC229C Post Treatment Evaluation: What Criteria and Imaging Protocol Should I Use?

Participants
Stephanie Nougaret, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To highlight current management of rectal cancer including sphincter- and organ-sparing treatment options 2) To describe how pretreatment multi-parametric rectal MRI may serve as a predictive biomarker of subsequent tumor response to chemoradiation (CRT) 3) To propose a step-by-step approach for accurate interpretation of rectal MRI following CRT and to illustrate how the information gleaned from post CRT multi-parametric rectal MRI may influence treatment decisions.

ABSTRACT

Recent changes in the management of patients with locally advanced rectal cancer highlight the need for accurate assessment of tumor response to chemoradiation (CRT). In the past, CRT was followed by surgical resection in nearly all patients, irrespective of response to CRT. However, new data suggest that surgery may not be necessary in patients with complete response. MR imaging

has become an essential tool to enable the oncology team to make appropriate treatment decisions. MRI has so far relied on changes in morphology as a measurement for response. However, this evaluation is hampered by the difficulties in differentiating residual tumor from radiation-induced fibrosis. Recent studies have suggested that adding diffusion-weighted imaging (DWI) to conventional MRI can aid this differentiation and thus improve the prediction of response after neoadjuvant therapy.Thus, the learning objectives for this lecture are as follows:1) To learn about the value of multi-parametric rectal MRI prior to and following CRT for the prediction and subsequent assessment of response to CRT. To understand how rectal MR imaging finding are essential to making patient-centered treatment decisions.2) To become familiar with "DISTANCE" mnemonic and diagnostic clues which provide a systematic approach to the interpretation of rectal MRI images in patients with rectal cancer prior to treatment and following CRT.

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Stephanie Nougaret, MD - 2013 Honored Educator

RC231

Master Class in Musculoskeletal Ultrasound (Hands-on)

Monday, Nov. 30 8:30AM - 10:00AM Location: E258

MK US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Marnix T. van Holsbeeck, MD, Detroit, MI (*Presenter*) Consultant, General Electric Company Consultant, Koninklijke Philips NV Stockholder, Koninklijke Philips NV Stockholder, General Electric Company Grant, Siemens AG Grant, General Electric Company
Catherine J. Brandon, MD, Ann Arbor, MI (*Presenter*) Stock options, VuCOMP, Inc
Michael A. Dipietro, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Alberto S. Tagliafico, MD, Genova, Italy (*Presenter*) Nothing to Disclose
Joseph H. Introcaso, MD, Neenah, WI (*Presenter*) Nothing to Disclose
Humberto G. Rosas, MD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize and identify pitfalls of scanning that lead to false positive or false negative musculoskeletal ultrasound results. 2) Perform skills for scanning difficult patients. 3) Follow rigorous protocols for the examination of different anatomic regions. 4) Position patients for more complicated musculoskeletal ultrasound examinations. 5) Recognize and integrate the importance of tissue movement in judging the functionality of the extremities.

ABSTRACT

In this Musculoskeletal Ultrasound Master class, an opportunity will be given to participants to start a written dialogue in advance to RSNA 2012. The electronically submitted questions will be sorted by instructors and organized per topic. A select number of recurrent themes in these questions will be prepared for dialogue on stage. When the questions focus on a particular scanning skill, the authors of the questions will be invited on the examination platform to show problems they encounter in their practice. By using a step-by step approach in solving the scanning issues, all who are present should benefit from the technical interactions on stage. Cameras will project scanning details on large screens. The seating in the master class will guarantee close proximity for an enriching interaction between audience and stage. At the end of the master class, the audience will be broken up in smaller groups for a more personal interaction with the instructors with the intent of improving scanning skills on an individual level.

Active Handout:Marnix T. van Holsbeeck

http://abstract.rsna.org/uploads/2015/12020755/RC231.pdf

RC232

Hospital Contracting: The Radiologist's and The Attorney's Perspectives

Monday, Nov. 30 8:30AM - 10:00AM Location: E451A

LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

1) Identify the important elements of a hospital professional services agreement (radiology contract). 2) Describe the principles of negotiations that will benefit radiologists in their interactions with hospital administrators. 3) Discuss the roles of the radiologist and the attorney in hospital contract negotiations.

Sub-Events

RC232A The Attorney's Perspective

Participants
William K. Davis JR, JD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

B) Negotiating a Difficult Hospital Contract: The Attorney's PerspectiveW. Kenneth Davis, Jr, Chicago, IL ABSTRACTThis course is structured to explore the issues and opportunities involved in the process of negotiating a hospital radiology professional services agreement (hospital radiology contract). The principles of contract negotiations will be discussed, and the role of both the radiologist and the radiology-knowledgeable attorney will be covered. How the radiology leadership and the practice attorney interact will be explored. Potentially problematic clauses will be presented, and suggestions will be made to modify or eliminate these clauses. The importance of having the practice integrated into the medical, social, and political fabrics of the hospital and the community will be stressed. The faculty will introduce the concept of power in a negotiation, and they will define common negotiation terms. Issues of radiology group communication and unity during the process will be discussed. There will be sufficient time for questions from the attendees.

Active Handout:William Kenneth Davis

http://abstract.rsna.org/uploads/2015/15002297/RC232A.pdf

RC232B Hospital Contracting: The Radiologist's Perspective

Participants
Lawrence R. Muroff, MD, Tampa, FL, (LRMuroff@hotmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

This course is structured to explore the issues and opportunities involved in the process of negotiating a hospital radiology professional services agreement (hospital radiology contract). The principles of contract negotiations will be discussed, and the role of both the radiologist and the radiology-knowledgeable attorney will be covered. How the radiology leadership and the practice attorney interact will be explored.Potentially problematic clauses will be presented, and suggestions will be made to modify or eliminate these clauses. The importance of having the practice integrated into the medical, social, and political fabrics of the hospital and the community will be stressed.The faculty will introduce the concept of power in a negotiation, and they will define common negotiation terms. Issues of radiology group communication and unity during the process will be discussed. There will be sufficient time for questions from the attendees.

RC250

Interventional Stroke Treatment: Practical Techniques and Protocols (An Interactive Session)

Monday, Nov. 30 8:30AM - 10:00AM Location: S402AB

ER NR IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Joshua A. Hirsch, MD, Boston, MA (*Moderator*) Shareholder, Intratech Medical Ltd

LEARNING OBJECTIVES

1) Describe the diagnostic evaluation and decision making algorithms leading to urgent endovascular treatment of acute stroke. 2) Review endovascular techniques for the treatment of acute stroke from microcatheter set up to intraarterial thrombolysis to mechanical thrombectomy. 3) Discuss case examples of endovascular treatment including patient selection, technique, and pitfalls.

ABSTRACT

Rapid advances in the evaluation, selection, treatment and management of the acute stroke patient necessitates an ongoing educational event highlighing the newest information, techniques and strategies for obtaining the best outcomes for our patients. In this session, all of these topics will be covered in a practical 'how to' and case based approach which is designed to help the practitioner implement best practices. The course is useful for those performing imaging, treatment or both. Analysis of the latest ongoing trials, devices and techniques will be presented. Endovascular tips and tricks will be discussed, as well as pitfalls in the treatment of these patients.

Sub-Events

RC250A A Birdseye View to the Interventional Approach to Acute Stroke Therapy

Participants
Allan L. Brook, MD, Bronx, NY (*Presenter*) Advisor, Johnson & Johnson Advisor, Medtronic, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

RC250B Data, Data, and More Data: Endovascular Therapy Is the Proven Treatment for Large Vessel Occlusion

Participants
David J. Fiorella, MD, PhD, Stony Brook, NY (*Presenter*) Institutional research support, Siemens AG; Institutional research support, Sequent Medical, Inc; Research support, MicroVention Inc; Consultant, Medtronic, Inc ; Consultant, Cardinal Health, Inc; Consultant, Penumbra, Inc; Owner, Vascular Simulations LLC; Owner, TDC Technologies; Owner, CVSL; ;

LEARNING OBJECTIVES

View learning objectives under main course title.

RC250C Optimizing Patient Selection with Imaging

Participants
Ramon G. Gonzalez, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the essential ischemic stroke physiology parameters that are essential in selecting patients for endovascular treatment of a large vessel occlusion. 2) Be familiar with the imaging methods that can measure ischemic stroke physiology parameters and their relative accuracy. 3) Use the best available evidence, recognize the optimal imaging approach to select patients with acute ischemic stroke for endovascular treatment.

ABSTRACT

Properly selected patients with acute ischemic stroke caused by large vessel occlusion (LVO) may be effectively and safely treated endovascularly with modern thrombectomy devices. We have developed a high-precision imaging tool for selecting such patients. It is an experience and evidence-based clinical triage tool that uses advanced imaging to identify INDIVIDUAL patients most likely to benefit from endovascular stroke therapy. It was based on over a decade of using advanced imaging (CT, CTA, CT perfusion, DWI, MR perfusion) in acute stroke patients and a critical review of the literature and has been validated in clinical trials. The approach focuses on answering the following key questions using modern imaging: 1. Is there a hemorrhage? Noncontrast CT 2. Is there an occlusion of the distal ICA and/or proximal MCA? CTA 3. Is irreversible brain injury below a specific threshold (e.g. <70ml)? DWI Perfusion imaging is not employed unless patients cannot undergo MRI, or they do not meet the criteria for intervention. Investigations to understand the reasons for the unsuitability of perfusion CT to substitute for DWI have revealed theoretical and practical shortcomings of CTP. A major problem is the low signal-to-noise (SNR) ratio of CT perfusion that results in a poor contrast-to-noise (CNR) ratio in severely ischemic brain. In a comparison between DWI and CTP in over 50 consecutive patients with LVA, Schaefer, et al. showed that the mean CNR of DWI was >4 while it was <1 for CTP derived CBF. The poor CNR results in large measurement error: using Bland-Altman analyses it was found that the 95% confidence interval was ~+/- 50 ml for ischemic lesion volume measurements in individual patients. The Cleveland Clinic adopted a nearly identical algorithm and their results were published. They reported that after the new algorithm was adopted, there was a ~50% reduction in mortality and a ~3-fold increase in good outcomes, despite a ~50% decrease in the number of procedures. A recent prospective observational trial at the

MGH using stentrievers and this imaging approach demonstrated >50% favorable outcomes (mRS 0-2) that is similar to recent randomized clinical trials. However, only 3 patients were evaluated for every patient that was treated, a screening to treatment ratio that is much lower than in recently published clinical trials.1. Gonzalez RG, Copen WA, Schaefer PW, Lev MH, Pomerantz SR, Rapalino O, et al. The Massachusetts General Hospital acute stroke imaging algorithm: an experience and evidence based approach. Journal of neurointerventional surgery. 2013;5 Suppl 1:i7-12.2. Wisco D, Uchino K, Saqqur M, Gebel JM, Aoki J, Alam S, et al. Addition of hyperacute MRI AIDS in patient selection, decreasing the use of endovascular stroke therapy. Stroke; a journal of cerebral circulation. 2014;45(2):467-72.3. Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. Lancet. 1986 Feb 8;1(8476):307-10.4. Schaefer PW, Souza L, Kamalian S, Hirsch JA, Yoo AJ, Kamalian S, Gonzalez RG, Lev MH. Limited reliability of computed tomographic perfusion acute infarct volume measurements compared with diffusion-weighted imaging in anterior circulation stroke. Stroke. 2015 Feb;46(2):419-24.

RC251

Common Dilemmas in Lung Imaging

Monday, Nov. 30 8:30AM - 10:00AM Location: E450B

CH CT OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC251A An Algorithm for Lung Nodule Interpretation

Participants
Christian J. Herold, MD, Vienna, Austria (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand how different clinical scenarios influence the management of patients with pulmonary nodules. 2) To apply state-of-the-art features, methods and guidelines for the work-up of pulmonary nodules. 3) To develop an algorithm for the management of pulmonary nodules for various risk groups.

RC251B Current Concepts in Lung Cancer Staging: What the Clinician Wants to Know

Participants
Brett W. Carter, MD, Houston, TX, (bcarter2@mdanderson.org) (*Presenter*) Author, Reed Elsevier; Consultant, St. Jude Medical, Inc; ;

LEARNING OBJECTIVES

1) Outline the staging system used for lung cancer. 2) Illustrate specific TNM descriptors through representative examples on imaging studies. 3) Synthesize TNM descriptors into stages and evaluate the impact on patient management. 4) Review limitations of the current system and assess the potential influence on image interpretation.

ABSTRACT

Lung cancer is the most common cause of cancer-related death in men and women in the United States. The seventh edition of the TNM staging system for lung cancer was published in 2009 by the International Union Against Cancer and the American Joint Committee on Cancer and was based on findings from the International Staging Project of the International Association for the Study of Lung Cancer (IASLC). In addition to the inclusion of small cell lung cancer and bronchopulmonary carcinoid, key revisions were made to the tumor (T) and metastasis (M) descriptors based on differential 5-year survival. As accurate staging of lung cancer is crucial to formulating treatment plans and optimizing survival, radiologists should be familiar with the current TNM staging system and understand the strengths of weaknesses of the various thoracic imaging techniques used to diagnose and stage the disease.

Honored Educators

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Brett W. Carter, MD - 2015 Honored Educator

RC251C A Simple Approach to Interstitial Lung Disease

Participants
Michael D. Hope, MD, San Francisco, CA, (michael.hope@ucsf.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify key findings of lung fibrosis and small airways disease. 2) List 4 telltale findings of specific subtypes of interstitial lung disease. 3) Apply a simple methods for reliable characterization of the majority of cases of interstitial lung disease.

RC252

US-guided Interventional Breast Procedures (Hands-on)

Monday, Nov. 30 8:30AM - 10:00AM Location: E264

BR IR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Jocelyn A. Rapelyea, MD, Washington, DC (*Moderator*) Consultant, General Electric Company
Margaret M. Szabunio, MD, Lexington, KY (*Presenter*) Nothing to Disclose
Shambhavi Venkataraman, MD, Boston, MA (*Presenter*) Nothing to Disclose
Angelique C. Floerke, MD, Washington, DC (*Presenter*) Consultant, CareFusion Corporation
Rachel F. Brem, MD, Washington, DC (*Presenter*) Board of Directors, iCAD, Inc Board of Directors, Dilon Technologies LLC Stock options, iCAD, Inc Stockholder, Dilon Technologies LLC Consultant, U-Systems, Inc Consultant, Dilon Technologies LLC Consultant, Dune Medical Devices Ltd
Karen S. Johnson, MD, Durham, NC, (karen.johnson2@dm.duke.edu) (*Presenter*) Research Consultant, Siemens AG
Nicole S. Lewis, MD, Washington, DC (*Presenter*) Nothing to Disclose
Kathleen R. Gundry, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Michael N. Linver, MD, Albuquerque, NM (*Presenter*) Scientific Advisory Board, Hologic, Inc; Scientific Advisory Board, Real Imaging Ltd

LEARNING OBJECTIVES

1) Describe the equipment needed for ultrasound guided interventional breast procedures. 2) Review the basic principles of ultrasound guidance and performance of minimally invasive breast procedures. 3) Practice hands-on technique for ultrasound guided breast interventional procedures.

ABSTRACT

This course is intended to familiarize the participant with equipment and techniques in the application of US guided breast biopsy and needle localization. Participants will have both basic didactic instruction and hands-on opportunity to practice biopsy techniques on tissue models with sonographic guidance. The course will focus on the understanding and identification of: 1) optimal positioning for biopsy 2) imaging of adequate sampling confirmation 3) various biopsy technologies and techniques 4) potential problems and pitfalls

RC253

Leveraging Your Data: Informatics Approaches and Solutions to Improve Imaging Care Delivery

Monday, Nov. 30 8:30AM - 10:00AM Location: E353A

IN SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Arun Krishnaraj, MD, MPH, Charlottesville, VA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify unmet needs of current and future practices with regards to emerging and existing informatics tools. 2) Apply existing and emerging informatics applications to improve report generation. 3) Demonstrate an understanding of how best to achieve consistency of radiologists' recommendations.

ABSTRACT

Existing and emerging informatics applications have the potential to markedly improve the quality of imaging care delivery. Much of the inefficiency and inconsistency of report generation could be potentially solved with the appropriate informatics application. In this session, the learner will gain an apprecation of the unmet needs of current and future pracitces and discover how novel applications developed at various institutions across the country are seeking to plug these voids and improve imaging care delivery.

Sub-Events

RC253A The Unmet Needs of Current and Future Practices

Participants
Michael E. Zalis, MD, Boston, MA (*Presenter*) Co-founder, QPID Health Inc; Chief Medical Officer, QPID Health Inc; Stockholder, QPID Health Inc

LEARNING OBJECTIVES

1) Describe some of the external mandates and requirements facing practicing radiologists. 2) Describe gaps in function that exist between these requirements and the functionality provided by EHR and PACS systems. 3) Provide example approaches and example solutions to bridge these gaps.

ABSTRACT

RC253B Augmenting Image Interpretation through the Use of Advanced Health Record Technology

Participants
Arun Krishnaraj, MD, MPH, Charlottesville, VA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Appreciate the current state of Electronic Health Record (EHR) technology and adoption in the United States. 2) Identify areas where EHR integration into the daily workflow of Radiologists is lacking. 3) Demonstrate an understanding of the importance of incorporating data contained in the EHR to generate high quality reports. 4) Understand the consequences of under utilizing data contained in the EHR.

ABSTRACT

Advanced heath information technologies, specifically EHR systems, are undergoing rapid dissemination and widespread adoption spurred by initiatives in the American Recovery and Reinvestment Act of 2009. When properly integrated into clinical workflow, an EHR can improve both the quality and efficiency of care delivery. Radiology has long been at the forefront with respect to information technology (IT), however the integration of EHR data into radiolgists' workflow is lacking which affects the efficiency, safety, and costs of Imaging. Emerging advanced heatlh record technologies which incorporate natural language processing and semantic search allow the radiologists to retrieve and incorporate relevant clinical data when generating reports thereby improving both efficiency and quality. In this session, the learner will explore how one such health intelligence platform, known as QPID (Queriable Patient Inference Dossier), allows for the creation of search queries tailored to the workflow of an abdominal radiologist.

RC253C Bone Age and Skeletal Atlas Decision Support Tools with Patient Context Integrated into Clinical Workflow

Participants
Cree M. Gaskin, MD, Keswick, VA, (cree@virginia.edu) (*Presenter*) Author with royalties, Oxford University Press; Author with royalties, Thieme Medical Publishers, Inc; ;

LEARNING OBJECTIVES

1) Review concepts for contemporary decision support tools for diagnostic radiologists. 2) Discuss bone age and skeletal atlas decision support tools integrated into clinical diagnostic workflow via context sharing.

ABSTRACT

There are numerous references available to radiologists to aid image interpretation or provide guidance on management of imaging findings. Given the vast amounts of information we are expected to know and the speed with which we are expected to perform our

clinical work, it is helpful to have quick and easy access to relevant resources at our point-of-care (e.g., during image interpretation and reporting). Such resources should be available in electronic format on our diagnostic workstations and, when relevant, be integrated with our clinical applications. Our Radiology Information System (RIS), PACS, and/or Electronic Health Record (EHR) can share study and patient context information with decision support tools to facilitate our diagnostic workflow. Examples to be shared include modern remakes of classic printed atlases in pediatric skeletal imaging, updated to contemporary electronic tools integrated with PACS and EHR applications to expedite workflow and reduce error.

RC253D Advanced Decision Support Tools for the Radiologists

Participants
Giles W. Boland, MD, Boston, MA (*Presenter*) Principal, Radiology Consulting Group; Royalties, Reed Elsevier

LEARNING OBJECTIVES

View learning objectives under main course title.

RC254

Health IT Policy Panel: The New Federal Requirement for Imaging Decision Support (H.R. 4302)

Monday, Nov. 30 8:30AM - 10:00AM Location: S102C

HP IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
David B. Larson, MD, MBA, Los Altos, CA (*Moderator*) Intellectual property license agreement, Bayer AG; Potential royalties, Bayer AG

Sub-Events

RC254A Overview of the Imaging Decision Support Requirement

Participants
Curtis P. Langlotz, MD, PhD, Menlo Park, CA, (langlotz@stanford.edu) (*Presenter*) Shareholder, Montage Healthcare Solutions, Inc; Advisory Board, Reed Elsevier; Advisory Board, Activate Networks, Inc;

LEARNING OBJECTIVES

1) Understand the requirements and scope of the new U.S. Federal decision support requirement in the Protecting Access to Medicare Act of 2014. 2) Learn the legal definition of appropriate use criteria. 3) Calculate the financial penalties for non-compliance. 4) Recognize the challenges CMS will face in implementing the law. 5) Recognize the challenges health care organizations will face in responding to the law.

Active Handout:Curtis P. Langlotz

http://abstract.rsna.org/uploads/2015/15003159/RC254A.pdf

RC254B The Origins of the Imaging Decision Support Legislation

Participants
Keith J. Dreyer, MD,PhD, Boston, MA (*Presenter*) Medical Advisory Board, IBM Corporation

RC254C Experience and Recommendations of the High Value Health Care Collaborative

Participants
Keith S. White, MD, Murray, UT, (keith.white@imail.org) (*Presenter*) Software support, Jidoka Systems

RC254D CMS Approach to Implementing the Legislation: Current Status

Participants
Joseph Hutter, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the key provisions of Section 218(b) of PAMA 2014. 2) Understand the CMS Final Rule setting up a new nationwide program for appropriate use criteria for imaging. 3) Understand the timetable for future components of the CMS program.

URL

https://www.federalregister.gov/articles/search?conditions%5Bregulation_id_number%5D=0938-AS40

RCA21

Creating, Storing, and Sharing Teaching Files Using RSNA's MIRC® (Hands-on)

Monday, Nov. 30 8:30AM - 10:00AM Location: S401AB

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Krishna Juluru, MD, New York, NY (*Moderator*) Nothing to Disclose
Andre M. Pereira, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how easy it is to install the new and improved RSNA teaching file software with the one-click installer. 2) Learn how to create, organize, and share teaching files, create conference documents and save interesting cases for yourself, your group or your department.

RCB21

Hands-on Introduction to Social Media (Hands-on)

Monday, Nov. 30 8:30AM - 10:00AM Location: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
C. Matthew Hawkins, MD, Decatur, GA, (matt.hawkins@emory.edu) (*Presenter*) Nothing to Disclose
Safwan Halabi, MD, Stanford, CA (*Presenter*) Nothing to Disclose
Neil U Lall, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose
Tirath Y. Patel, MD, Toledo, OH (*Presenter*) Nothing to Disclose
Amy L. Kotsenas, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Appreciate the professional relevance of social media for radiologists. 2) Understand the differences between Facebook pages and personal accounts. 3) Set up and use a Twitter account. 4) Understand the purpose of hashtags, lists, tweetchats, and DMs. 5) Get acquainted with other radiologists and radiology organizations on Twitter . 6) Understand the difference between and utility of professionally oriented social networking sites such as Doximity and LinkedIn. 7) Understand how to safely /securely communicate via social media while maintaining HIPAA requirements.

ABSTRACT

URL

http://bit.ly/RSNASocialMediaIntro

Active Handout:Safwan Halabi

http://abstract.rsna.org/uploads/2015/11035016/RCB21.pdf

Active Handout:Amy Louise Kotsenas

http://abstract.rsna.org/uploads/2015/11035016/RCB21.pdf

RCC21

Imaging Informatics: Year in Review (RSNA/AMIA/SIIM Joint Sponsorship)

Monday, Nov. 30 8:30AM - 10:00AM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RCC21A Best of Ontologies, Reporting, and Natural Language Processing

Participants
Charles E. Kahn JR, MD, MS, Philadelphia, PA, (charles.kahn@uphs.upenn.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the year's most significant advances in imaging informatics. 2) Understand current directions in biomedical informatics research of importance to radiology, including ontologies, data mining, natural language processing, reporting systems, and decision support. 3) Describe recent advances in image processing and analysis, and their applications in radiology, including filtering, image reconstruction and visualization, computer-aided diagnosis, and pattern recognition.

ABSTRACT

Informatics plays an increasingly important role in radiology research and practice. This session, developed in partnership with the Americal Medical Informatics Association (AMIA) and the Society for Imaging Informatics in Medicine (SIIM), highlights the year's most important advances in imaging informatics. We present leading research in image processing, image analysis, and other areas of biomedical and health informatics that impact medical imaging, including filtering, image reconstruction and visualization, computer-aided diagnosis, and pattern recognition, decision support, ontologies, reporting, data mining, and natural language processing. The presentations will feature techniques that address clinical problems and systems that have been tested in clinical trials. This course provides a comprehensive 'Year in Review' of informatics in medical imaging.

URL

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Charles E. Kahn JR, MD, MS - 2012 Honored Educator

RCC21B Best of Image Processing and Analysis

Participants
Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Stockholder, Evidentia Health, Inc; Stockholder, OneMedNet Corporation; Stockholder, VoiceIt Technologies, LLC

LEARNING OBJECTIVES

1) In this session, important advances in knowledge about image processing will be reviewed.

ABSTRACT

A number of key papers have been published in the past year focusing on image processing, information extraction, and computer aided diagnosis. We will review these papers and describe the relevance of them to current and future practice.

URL

MSAS22

Got Smart Data? Trailblazing the Path from Insights to Actions in Radiology (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Monday, Nov. 30 10:30AM - 12:00PM Location: S105AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Patricia Kroken, Albuquerque, NM (*Moderator*) Nothing to Disclose
Dana Aragon, RT, Albuquerque, NM (*Moderator*) Nothing to Disclose
Jon Hernandez, Parker, CO (*Presenter*) Nothing to Disclose
Nicole Newsom, MHA, Greenville, SC, (nnewsom@advbi.com) (*Presenter*) Employee, MSN Innovative Strategies
Philip Heckendorn, Dallas, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the importance of innovative solutions in value-based care delivery. 2) Describe Business Intelligence terminology and differentiate the concept of smart, meaningful data in radiology informatics. The value equation will be explored. 3) Examine practical applications of radiology insights that drive quality, efficiency, and collaboration.

URL

http://www.advbi.com/rsna15.html

MSCM22

Case-based Review of Magnetic Resonance (An Interactive Session)

Monday, Nov. 30 10:30AM - 12:00PM Location: S100AB

BR CH HN NR MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
John R. Leyendecker, MD, Dallas, TX (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the role of MRI in diagnosing abnormalities of the breast. 2) Be familiar with the MRI appearance of select cardiothoracic abnormalities. 3) Effectively use MRI to diagnose disorders of the head and neck. 4) Distinguish between a variety of brain lesions based on MRI appearance.

ABSTRACT

This session will help attendees recognize and manage select, commonly encountered breast, cardiothoracic, head and neck, and brain abnormalities based on their MRI appearances using a case-based, interactive format.

Sub-Events

MSCM22A Breast MRI

Participants
Fiona J. Gilbert, MD, Cambridge, United Kingdom (*Presenter*) Medical Advisory Board, General Electric Company; Research Grant, GlaxoSmithKline plc; Research Grant, General Electric Company

LEARNING OBJECTIVES

View learning objectives under main course title.

MSCM22B Cardiothoracic MRI

Participants
Suhny Abbara, MD, Dallas, TX (*Presenter*) Author, Reed Elsevier; Editor, Reed Elsevier; Institutional research agreement, Koninklijke Philips NV; Institutional research agreement, Siemens AG

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

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Suhny Abbara, MD - 2014 Honored Educator

MSCM22C Head and Neck MRI

Participants
Daniel W. Williams III, MD, Winston Salem, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSCM22D Brain MRI

Participants
Mauricio Castillo, MD, Chapel Hill, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the differential diagnosis and imaging features of intraventricular massses in children and adults. 2) Review the cerebral complications of treatment vascular malformations. 3) Review the differential diagnosis and imaging features of masses arising in the cerebello-pontine angle region. 4) Review the differential diagnosis of cerebral microbleeds.

MSMC22

Cardiac CT Mentored Case Review: Part II (In Conjunction with the North American Society for Cardiac Imaging) (An Interactive Session)

Monday, Nov. 30 10:30AM - 12:15PM Location: S406A

CA VA CT

AMA PRA Category 1 Credits ™: 1.75
ARRT Category A+ Credits: 2.00

Participants
Pamela K. Woodard, MD, Saint Louis, MO (*Director*) Research Consultant, Bristol-Myers Squibb Company; Research Grant, Astellas Group; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Bayer AG; Research agreement, Siemens AG; Research Grant, Actelion Ltd; Research Grant, Guerbet SA; ; ;
Geoffrey D. Rubin, MD, Durham, NC (*Moderator*) Consultant, Fovia, Inc; Consultant, Informatics in Context, Inc; Research Consultant, General Electric Company;
Arthur E. Stillman, MD, PhD, Atlanta, GA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify cardiac and coronary artery anatomy. 2) Recognize cardiac disease processes, including coronary atherosclerosis, as diagnosed on CT. 3) Understand methods of cardiac CT and coronary CT angiography post-processing.

Sub-Events

MSMC22A Coronary Atherosclerosis I

Participants
Geoffrey D. Rubin, MD, Durham, NC (*Presenter*) Consultant, Fovia, Inc; Consultant, Informatics in Context, Inc; Research Consultant, General Electric Company;

LEARNING OBJECTIVES

View learning objectives under main course title.

MSMC22B Coronary Atherosclerosis II

Participants
Smita Patel, MBBS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

MSMC22C Valves and Cardiac Function

Participants
Andrew J. Bierhals, MD, Saint Louis, MO (*Presenter*) Research Grant, Johnson & Johnson

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Cardiac CT can provide information on valves and function when retrospective ECG gating is used in the acquisition. These studies require extensive image post-processing to accurately depict the moving structures. This presentation will highlight basic image acquisition as well as the evaluation of normal and abnormal patients.

MSMI22

Molecular Imaging Symposium: Neurologic MI Applications

Monday, Nov. 30 10:30AM - 12:00PM Location: S405AB

NR MI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Satoshi Minoshima, MD, PhD, Salt Lake City, UT, (sminoshima@hsc.utah.edu) (*Moderator*) Royalties, General Electric Company; Consultant, Hamamatsu Photonics KK; Research Grant, Hitachi, Ltd; Research Grant, Nihon Medi-Physics Co, Ltd; Research Grant, Astellas Group; Research Grant, Seattle Genetics, Inc;
Peter Herscovitch, MD, Bethesda, MD (*Moderator*) Nothing to Disclose

Sub-Events

MSMI22A Overview of MI in Neurology

Participants
Satoshi Minoshima, MD, PhD, Salt Lake City, UT (*Presenter*) Royalties, General Electric Company; Consultant, Hamamatsu Photonics KK; Research Grant, Hitachi, Ltd; Research Grant, Nihon Medi-Physics Co, Ltd; Research Grant, Astellas Group; Research Grant, Seattle Genetics, Inc;

LEARNING OBJECTIVES

1) Learn recent development of molecular imaging in the field of neurosciences. 2) Understand technologies used in molecular brain imaging. 3) Discuss opportunities and challenges in molecular brain imaging.

MSMI22B MI in Dementia

Participants
Alexander Drzezga, MD, Cologne, Germany (*Presenter*) Research Grant, Eli Lilly and Company; Speakers Bureau, Siemens AG; Speakers Bureau, General Electric Company; Speakers Bureau, Piramal Enterprises Limited; Research Consultant, Eli Lilly and Company; Research Consultant, Piramal Enterprises Limited; ; ; ; ; ;

LEARNING OBJECTIVES

1) Gain overview on types of molecular neuropathology involved in the development of different forms of dementia and understand currently discussed disease concepts. 2) Learn about the currently available methods for imaging molecular pathology such as amyloid-deposition and tau-aggregation in dementia and their current status of validation. 3) Gain insights on the clinical value of the individual available methods and their combination with regard to earlier detection, more reliable diagnosis and therapy monitoring of disease.

MSMI22C MI in Movement Disorders

Participants
Kirk A. Frey, MD, PhD, Ann Arbor, MI (*Presenter*) Consultant, MIM Software Inc; Consultant, Siemens AG; Consultant, Eli Lilly and Company; Stockholder, General Electric Company; Stockholder, Novo Nordisk AS; Stockholder, Bristol-Myers Squibb Company; Stockholder, Merck & Co, Inc; Stockholder, Medtronic, Inc

MSMI22D Clinical Translation and Approval

Participants
Peter Herscovitch, MD, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the FDA approval process for diagnostic radiopharmaceuticals Describe the current status of CMS coverage for diagnostic radiopharmaceuticals. 2) Describe the current status of CMS coverage for amyloid PET radiopharmaceuticals and coverage with evidence development (CED).

ABSTRACT

The final steps in clinical translation of molecular imaging radiopharmaceuticals for neurological studies are approval by the U.S. Food and Drug Administration (FDA) for marketing and by insurance carriers for reimbursement. Given the age of patients most likely to require brain imaging studies for neurodegenerative disorders, coverage approval by the U.S. Centers for Medicare and Medicaid ("Medicare") is crucial. This talk will discuss the steps required that lead to FDA approval of a radiopharmaceutical, including the IND process and Phase 1, 2, and 3 clinical trials. It should be noted that FDA approval does not necessarily lead to Medicare approval, especially for PET agents. The CMS approval process will be outlined, including the increasing need to demonstrate the ability of PET imaging to provide improved health outcomes. CMS coverage with evidence development (CED) of PET amyloid imaging agents will be described.

MSMI22E Emerging Molecular Brain Imaging

Participants
Jonathan E. McConathy, MD, PhD, Saint Louis, MO, (mcconathyj@mir.wustl.edu) (*Presenter*) Research Consultant, Eli Lilly and Company; Research Consultant, Blue Earth Diagnostics Ltd; Research Consultant, Siemens AG; Research support, GlaxoSmithKline plc

LEARNING OBJECTIVES

1) Participants will be familiar with newer molecular imaging approaches to dementia including tracers targeting tau, alpha-synuclein, and neuroinflammation as well as simultaneous PET/MRI which is particularly well-suited to neuroimaging.

ABSTRACT

Imaging biomarkers for Alzheimer's disease (AD) and other neurodegenerative diseases are playing increasingly important roles in both research and patient care. Many neurodegenerative diseases involve the deposition of characteristic proteins including amyloid, tau, and alpha-synuclein which are target for molecular neuroimaging and potentially for therapy. Additionally, processes such as neuroinflammation appear to contribute to the pathophysiology of many neurodegenerative diseases including AD. In this talk, these newer approaches to molecular neuroimaging in dementia will be discussed including their potential clinical applications in patients with cognitive impairment and dementia.

RCA22

A Practical Introduction to Structured Reporting Tools and Resources

Monday, Nov. 30 10:30AM - 12:00PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Justin Kirby, Bethesda, MD (*Presenter*) Stockholder, Myriad Genetics, Inc
Pattanasak Mongkolwat, PhD, Bangkok, Thailand, (pmongkolwat@gmail.com) (*Presenter*) Nothing to Disclose
Daniel L. Rubin, MD, MS, Palo Alto, CA (*Presenter*) Nothing to Disclose
David A. Clunie, MBBS, Bangor, PA (*Presenter*) Owner, PixelMed Publishing LLC
Andriy Fedorov, PhD, Boston, MA, (andrey.fedorov@gmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the advantages of using structured data capture tools for research at your institution. 2) Learn how RSNA Radlex and other popular lexicons can help reduce ambiguity in your data. 3) Learn about tools leveraging the National Cancer Institute's Annotation Imaging and Markup (AIM) format for reporting radiologist observations and quantitative image analysis results. 4) Learn about tools leveraging DICOM for reporting quantitative image analysis results.

ABSTRACT

Institutions across the world are sitting on a potential gold mine of imaging-related information about their patients, but many are unable to make use of it. Structured reporting helps address this problem by leveraging standardized lexicons and case report forms to extract meaningful information from images and enable easy reuse of the resulting data. A number of initiatives have been developed by academic institutions, governments, and other organizations in order to help promote the broader use structured reporting in clinical imaging research. This course seeks to convey a basic understanding of structured reporting concepts and a summary of available tools and resources. Participants should leave the course with a knowledge of which tools/resources will best suit their needs and how to get started with using them.

Active Handout:Andriy Fedorov

http://abstract.rsna.org/uploads/2015/15002989/Active RCA22.pdf

Honored Educators

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Daniel L. Rubin, MD, MS - 2012 Honored Educator
Daniel L. Rubin, MD, MS - 2013 Honored Educator

RCB22

Slicer: 3D Interactive Visualization of DICOM Images for Radiology Applications (Hands-on)

Monday, Nov. 30 10:30AM - 12:00PM Location: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Sonia M. Pujol, PhD, Boston, MA (*Presenter*) Nothing to Disclose
Ron Kikinis, MD, Boston, MA (*Presenter*) Nothing to Disclose
Kitt Shaffer, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Facilitate interpretation of DICOM images through the use of computer-assisted 3D visualization. 2) Increase the understanding of the correlation of the three dimensional relationships of the segments of the liver and lung with the surrounding vascular anatomy. 3) Introduce cutting-edge open-source computer graphics applications for Radiology.

ABSTRACT

Three-dimensional visualization of anatomy is emerging as a vital component of clinical imaging through the combined development of technological breakthroughs in Radiology hardware and increasingly sophisticated software tools for medical image analysis. For the past 10 years, the National Alliance for Medical Image Computing (NA-MIC), one of the seven National Centers for Biomedical Computing part of the NIH Roadmap for medical research, has converted some of the major scientific advances made by the biomedical imaging community into open-source software tools, contributing to increase the deployment of cutting-edge visualization techniques on a national and international scale.As part of the NA-MIC toolkit, the 3D Slicer open-source software has been developed as a technology delivery platform for clinical researchers. 3D Slicer has evolved into a multi-institution effort to share the latest advances in image analysis with the scientific and clinical community. This course is an introduction to the basics of viewing and interacting in 3D with DICOM volumes and anatomical models using 3D Slicer. The course is divided into three sections: the first part introduces the concepts of 3D visualization through an hands-on training session using an MR DICOM dataset of the brain and 3D reconstructed models of cerebral structures; the second section presents 3D models of the segments of the liver reconstructed from three clinical cases; and the third section guides the user through the exploration of the bronchopulmonary segments of the lung reconstructed from DICOM images. Interactions with 3D anatomical models are fostered by a series of radiological tasks for participants to complete for each clinical case. Detailed answers to the tasks are provided during the workshop as the instructors guide the audience through the 3D visualization settings to enhance the understanding of the complexity of the anatomical structures involved.

URL

RCC22

IHE Clinical Solutions for Interoperability - Imaging and Beyond: IHE and HIE does the Order Matter?

Monday, Nov. 30 10:30AM - 12:00PM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
David S. Mendelson, MD, Larchmont, NY (*Moderator*) Spouse, Employee, Novartis AG; Advisory Board, Nuance Communications, Inc; Advisory Board, General Electric Company; Advisory Board, Toshiba Corporation
David S. Mendelson, MD, Larchmont, NY (*Presenter*) Spouse, Employee, Novartis AG; Advisory Board, Nuance Communications, Inc; Advisory Board, General Electric Company; Advisory Board, Toshiba Corporation
Angela Lianos, MSc, Toronto, ON (*Presenter*) Nothing to Disclose
Mariann Yeager, MBA, Maclean, VA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the importance of interoperability throughout healthcare 2) Understand the importance of standards to ensure interoperability 3) Understand the role of IHE profiles in defining workflows and the applicable standards including XDS and XDS-I 4) Learn about real world implementations including Health Information Exchanges (The Sequoia Project) and focused Radiology solutions (Canada HealthInfoway) including Personal Health Records (The RSNA Image Share) 5) Learn the status of the RSNA Image Share and the RSNA Image Share Validation Program (To be announced at this meeting)

ABSTRACT

This course will focuson HIT inteoperability and its importance in providing for the optimal care of patients. The session will start with a review of standards and the role of IHE. The discussion will then move to a discussion of HIEs via The Sequoia Project (Heatlheway and Carequality) and in Canada where the Canada HealthInfoway project is underway.

SPCP21

Germany Presents: Population-based Imaging: How Broader Research Efforts Can Affect Everyday Care and Prevention

Monday, Nov. 30 10:30AM - 12:00PM Location: E353C

OT RS

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Norbert Hosten, MD, Greifswald, Germany (*Moderator*) Institutional research agreement, Siemens AG; Institutional research agreement, Bayer AG; Stockholder, Siemens AG
Gabriele A. Krombach, MD, Aachen, Germany (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Appraise the contribution which Population-based Imaging can make to radiological knowledge. 2) Differentiate between classical, prospective double-blind studies and the epidemiological, non-interventional approach to generate radiological knowledge. 3) Assess information regarding normal findings, normal range and the like as generated by Population-based Imaging studies.

ABSTRACT

The „SHIP" (Study of health in Pomerania, Germany) has allowed to do more than 2000 whole-body MR scans in normal subjects in the setting of an on-going epidemiological study during several years. An body of knowledge regarding the organization of Population MR Imaging, the handling of incidental findings, the range of normal imaging findings and of imaging-related biomarkers has been generated. The course presents information about normal contrast enhancement patterns in the breast generated in a large group (> 500); about MR findings both pathological and non-pathological that may be made in individuals in the absence of disease; about the distribution of quantitative parameters in cardiac imaging (plain and enhanced) in subjects in the absence of overt heart disease. The success of the SHIP has encouraged to perform a similar, nation-wide study in Germany on an even larger scale. 5 centers have started to perform whole-body MRI in study participants. A large body of information on health status of the participants is generated by epidemiologists. Follow-up will be performed on a regular base in the frame of the so-called „National Cohort". Information on the value of radiological methods will be generated by epidemiological methods, namely long-time follow up.

URL

Sub-Events

SPCP21A Opening Remarks

Participants
Ronald L. Arenson, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Norbert Hosten, MD, Greifswald, Germany (*Presenter*) Institutional research agreement, Siemens AG; Institutional research agreement, Bayer AG; Stockholder, Siemens AG

LEARNING OBJECTIVES

1) Appraise the contribution which Population-based Imaging can make to radiological knowledge. 2) Recommend Population based MR Imaging as a vauable part of Population based epidemiological studies.

ABSTRACT

"Population-based MR Imaging" was chosen as the topic for this year's RSNA "Germany presents:" session. In Fermany, whole-body MRI is performed both in a regional study (Study of Health in Pomerania - "SHIP") and in the "National Cohort" which just started. The session explains (1) how normal ranges for contrast enhancement can be established in very large numbers of healthy subjects; (2) what "incidental" (or in the case of MRI patients) "unexpected" findings may be found on whole body MRI, (3) how whole-body MRI may be set up in epidemiological population-based studies.

SPCP21B Roentgen - An X-Ray Journey

Participants

LEARNING OBJECTIVES

View learning objectives under main course title.

SPCP21C What Is Normal? Reference Values Derived from Population-Imaging and Their Role in Clinical Practice

Participants
Katrin Hegenscheid, MD, Greifswald, Germany (*Presenter*) Research Grant, Bayer AG; Research Grant, Siemens AG; Research Grant, XERA 3 Deutschland GmbH

LEARNING OBJECTIVES

1) How population-based data are used to establish reference values for clinical diagnostics. 2) Which methods and procedures are necessary for standardized analysis of large amounts of image data. 3) Which reference values have been developed so far from the population-based Study of Health in Pomerania and what clinical significance they have.

ABSTRACT

Prospective, population-based studies investigate the interaction between genetic predisposition for a disease, exposure to environmental factors and disease risk. They are a prerequisite for the development of prevention strategies. In the last decades due to its non-ionizing, examiner-independent, and high-resolution nature MRI has been implemented increasingly in epidemiological research. In 2008, the Study of Health in Pomerania (SHIP) was the first prospective population-based cohort study that offered a standardized whole-body MRI protocol for 3,772 participants aged 21 to 90 years. The primary objective of epidemiologic whole-body MR imaging is to phenotype a large subset of participants and to establish a comprehensive morphologic and functional imaging bio-repository. In this presentation we describe how this bio-repository is used to derive reference values from Population-Imaging and their role in clinical practice.Since manual segmentation of a three dimensional organ is a laborious, time-consuming, and examiner-dependent process, it was necessary to develop automated methods for 3D analysis of a large set of data and organs, e.g. the lungs, the liver, and the breasts. Supported by these automated segmentation methods first studies on reference values were conducted. For example reference values for the ascending and descending aortic wall thickness were provided its association with age was investigated. Reference values for the gray and white matter brain volume were provided and the influence of genes, exogenous noxae, or diseases were described. We not only describe how organ volumes but also tissue analyzes based on population-based data are performed. Methods for MR based fat quantification of the liver and the pancreas were developed and the prevalence of fatty organ degeneration and its causes was investigated in the normal population. In women the influence of anthropometric measures and menopausal status on the contrast enhancement of normal breast parenchyma was investigated and how it influences image analysis. Finally, we will show how reference values for the anterior chest wall thickness are used for the optimal design of protective devices and personal body armor and influence established trauma guidelines for decompression of tension pneumothorax.

SPCP21D Why Population-Imaging may Help in Advancing Radiology: The German National Cohort

Participants
Fabian Bamberg, MD, MPH, Munich, Germany, (fbamberg@post.harvard.edu) (*Presenter*) Speakers Bureau, Bayer AG; Speakers Bureau, Siemens AG; Research Grant, Bayer AG; Research Grant, Siemens AG;

LEARNING OBJECTIVES

View learning objectives under main course title.

SPCP21E No Need to Look for Incidental Findings? Role in Clinical and Research Settings

Participants
Sabine Weckbach, MD, Heidelberg, Germany (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Will be able to define "Incidental Finding ("IF"). 2) Will understand the underlying ethical problematic of Ifs. 3) Will be aware of possible onsequences of IF. 4) Will know about differences between imaging modalities in detecting IFs. 5) Will understand and be able to describe the categorization of IFs. 6) Will be able to differentiate between Ifs in clinical setting and research environment and understand the different roles of radiologist and researcher. 7) Will be shortly informed about different approaches to IFs in different population based studies. 8) Will be provided a summary of management recommendations of IFs in clinical and research setting.

ABSTRACT

All findings which arise in the context of radiological diagnostics, potentially affect the health of a subject and without intention to detection of the corresponding finding are considered as radiological incidental findings (IF). The prevalence of IFs is worldwide increasing due to the wider usage of modern imaging techniques such as MRI and CT in routine clinical practice as well as due to include imaging such as whole-body MRI in large population-based cohorts. From medical perspective, there is a need to report IFs in cases of potentially clinically relevant findings that need further workup or therapy. However, it is generally known that IFs may have a direct influence on life of the affected patient/ participant. The reporting of radiological IF may lead to further (even invasive) diagnostics and treatment and cause severe anxiety of patients and study participants. Possibly, there might also result insurance and occupational issues from the reporting of IFs. Therefore, subjects must especially be protected from consequences of false-positives findings. This highlights why a very responsible approach to the reporting of IFs is warranted. The management of IFs in clinical routine is regulated by the guidelines of the different academic societies. The management of IFs in the setting of research studies differs depending on various factors such as study design, health status of enrolled subjects, etc. So far, wide differences in approaches to IFs in different population based studies are observed. The course will illustrate why in general IFs should be disclosed to the imaged subject if they are potentially clinically relevant. It will demonstrate the differences between IFs in clinical setting and research environment and highlight the different roles of radiologist and researcher.

URL

SPCP21F Biomarkers of Cardiac Function in Population-Based Studies

Participants
Marc Dewey, MD, Berlin, Germany (*Presenter*) Research Grant, General Electric Company; Research Grant, Bracco Group; Research Grant, Guerbet SA; Research Grant, Toshiba Corporation; Research Grant, European Commission; Research Grant, German Research Foundation; Speakers Bureau, Toshiba Corporation; Speakers Bureau, Guerbet SA; Speakers Bureau, Bayer AG; Consultant, Guerbet SA; Author, Springer Science+Business Media Deutschland GmbH; Editor, Springer Science+Business Media Deutschland GmbH; Institutional research agreement, Siemens AG; Institutional research agreement, Koninklijke Philips NV; Institutional research agreement, Toshiba Corporation; ; ; ; ; ; ; ; ;

LEARNING OBJECTIVES

View learning objectives under main course title.

SPCP21G Discussion and Closing Remarks

Participants
Gabriele A. Krombach, MD, Aachen, Germany (*Presenter*) Nothing to Disclose
James P. Borgstede, MD, Colorado Springs, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RCA23

3D Printing (Hands-on)

Monday, Nov. 30 12:30PM - 2:00PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Moderator*) Research Grant, Toshiba Corporation;
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Research Grant, Toshiba Corporation;
Jane S. Matsumoto, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Dimitris Mitsouras, PhD, Boston, MA (*Presenter*) Research Grant, Toshiba Corporation; Speakers Bureau, Toshiba Corporation
Andreas Giannopoulos, MD, Boston, MA, (agiannopoulos1@partners.org) (*Presenter*) Nothing to Disclose
Nicole Wake, MS, New York, NY (*Presenter*) Nothing to Disclose
Peter C. Liacouras, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose
Thomas A. Foley, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Kiaran P. McGee, PhD, Rochester, MN (*Presenter*) Nothing to Disclose
Michael W. Itagaki, MD, MBA, Seattle, WA (*Presenter*) Owner, Embodi3D, LLC
Shannon N. Zingula, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Leonid Chepelev, MD,PhD, Ottawa, ON (*Presenter*) Nothing to Disclose
Adnan M. Sheikh, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
AiLi Wang, Ottawa, ON (*Presenter*) Nothing to Disclose
Wilfred Dang, BS, Ottawa, ON (*Presenter*) Nothing to Disclose
Ekin P. Akyuz, BSc, Ottawa, ON (*Presenter*) Nothing to Disclose
Taryn Hodgdon, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carlos H. Torres, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Anji Tang, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the Standard Tessellation Language (STL) file format that is used in 3D priting. 2) Be exposed to a software package to enable segmentation of DICOM images using semi-automated and manual segmentation algorithms, allowing the user to demarcate desired parts. The most commonly used tools are thresholding, region growing, and manual sculpting. 3) Learn refinement of an output STL output so that it can be optimized for accurate printing of the desired anatomy and pathology. This step uses Computer Aided Design (CAD) software is used to perform steps such as "wrapping" and "smoothing" to make the model more homogeneous.

ABSTRACT

"3D printing" refers to fabrication of a tangible object from a digital file by a 3D printer. Materials are deposited layer-by-layer and then fused to form the final object. There are several 3D printing technologies that share similarities but differ in speed, cost, and resolution of the product. Digital Imaging and Communications in Medicine (DICOM) image files cannot be used directly for 3D printing; further steps are necessary to make them readable by 3D printers. The purpose of this hands-on course is to convert a set of DICOM files into a 3D printed model through a series of simple steps. Some of the initial post-processing steps may be familiar to the radiologist, as they share common features with 3D visualization tools that are used for image post-processing tasks such as 3D volume rendering. However, some are relatively or completely new to radiologists, including the manipulation of files in Standard Tessellation Language (STL). It is the STL format that is read by the 3D printer and used to output the hand held part of the patient's anatomy. This 90 minute session will begin with a DICOM file and will proceed through the steps to create a printable STL file. An extensive training manual will be provided before the meeting. It is highly recommended that participants review the training manual to optimize the experience at the workstation.

URL

Active Handout:Frank John Rybicki

http://abstract.rsna.org/uploads/2015/14003456/Active RCA13.pdf

RCB23

Using Keynote: An Alternative to Power Point (Hands-on)

Monday, Nov. 30 12:30PM - 2:00PM Location: S401CD

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Shawn D. Teague, MD, Indianapolis, IN (*Presenter*) Stockholder, Apple Inc

LEARNING OBJECTIVES

1. Modify the master slides used in a template. 2. Change the aspect ratio for a presentation from 4:3 to 16:9. 3. Utilize movies in a presentation. 4. Utilize the remote control feature in Keynote with a mobile device.

RCC23

Structured Reporting and the RSNA Reporting Initiative

Monday, Nov. 30 12:30PM - 2:00PM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RCC23A Herding the Cats: Successfully Implementing a Department-Wide Standardized Reporting Program

Participants
David B. Larson, MD, MBA, Los Altos, CA (*Presenter*) Intellectual property license agreement, Bayer AG; Potential royalties, Bayer AG

LEARNING OBJECTIVES

1) Understand critical interpersonal elements to consider in implementing and managing a department-wide standardized structured report program. 2) Understand the technical challenges associated with implementing and managing a department-wide standardized structured report program.

ABSTRACT

Modern voice recognition technology has made department-wide standardized structured reporting feasible. However, the most significant challenges often lie in the interpersonal and organizational aspects. The author will discuss his experience in implementing and maintaining department-wide standardized structured reporting programs at two academic institutions, highlighting critical steps, major pitfalls, and strategies for success. The session will focus on those who might wish to develop department-wide structured reporting programs at their own institutions.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

David B. Larson, MD, MBA - 2014 Honored Educator

RCC23B RSNA's Reporting Initiative: Recent Progress and New Directions

Participants
Charles E. Kahn JR, MD, MS, Philadelphia, PA, (charles.kahn@uphs.upenn.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the background and rationale for RSNA's reporting initiative. 2) Describe recent advances in the technologies for radiology reporting. 3) Explore how reporting can add augment radiology's value to the healthcare enterprise. 4) Envision the latest directions and opportunities for radiology reporting.

ABSTRACT

Since 2007, the RSNA has taken a leading role in developing tools and clinical content to help radiologists improve their reporting practices. RSNA's library of best-practice reporting templates (www.radreport.org) has seen more than 2 million views and downloads. The 'Management of Radiology Report Templates' (MRRT) profile and a DICOM standard for transmitting template-based reports into the electronic health record (EHR) have been recently developed. These standards, and a set of tools that use them, provide new opportunities for information from radiology reports to be integrated into the clnical enterprise. The 'Open Template Library' (open.radreport.org) allows any RSNA member to contribute report templates, and the open-source 'T-Rex' template editor simplifies the editing process. Through partnerships with other organizations, RSNA is seeking to improve and extend these approaches. This presentation will highlight recent advances and new directions in radiology reporting.

Honored Educators

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Charles E. Kahn JR, MD, MS - 2012 Honored Educator

RCC23C radreport.org: Facing Challenges and Moving Forward

Participants
Marta E. Heilbrun, MD, Salt Lake City, UT, (marta.heilbrun@hsc.utah.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how to share templates on open.radreport.org Know how templates from open.radreport.org are promoted to

1) Understand how to share templates on openradreporting.org 2) Know how templates from openradreporting.org are promoted to radreport.org 2) Describe the active collaborations with the European Society of Radiology (ESR) and other societies with the RSNA structured reporting effort.

ABSTRACT

As a component of the RSNA structured reporting initiative a select template library was created and is available at www.radreport.org. In order to facilitate the exchange of templates and to identify best practices, a resource for hosting templates created by RSNA members and affiliated societies has been created at the www.open.radreport.org site. This presentation will walk the audience through the process for sharing templates on open.radeport.org and using the T-Rex editor to create MRRT templates. Additionally, the activities of the Template Library Advisory Panel (TLAP), a joint collaboration between the RSNA and the ESR will be described. The TLAP is responsible for promoting the crowd-sourced templates to the the select template library will be described.

MSAS23

Compassion Burnout (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Monday, Nov. 30 1:30PM - 3:00PM Location: S105AB

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
David B. Nicholson, Charlottesville, VA (*Moderator*) Nothing to Disclose
Kathleen Kath, Livonia, MI (*Moderator*) Nothing to Disclose
Marcus Engel, Orlando, FL, (Marcus@MarcusEngel.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Convey the foundation of compassionate care: human presence Utilize "I'm Here" to offer security and empathy to vulnerable patients Recognize that many times, the healing power of human presence is the best (and sometimes only) thing a health care professional can do for a patient. 2) Demonstrate an understanding of individual patient and family needs in a clinical setting Effective communication requires using language and terminology that can be easily processed by the patient and family Interpret patient and family interactions with an understanding of individual backstories. 3) Implement best practices in patient communication Instill patient confidence by managing up (complimenting co-workers, sharing accolades of the institution, and positive reinforcement regarding excellence in PC.

ABSTRACT

Participants of the session will be reminded of the vital role they play in the healing process of patients. The lecture details the experience of a young patient during hospitalization, the care and compassion shown by health care professionals and the importance of health care professionals to be safe, secure, and appreciated in their role within this sacred field. Participants will also come away with an understanding of each patient and co-workers individuality, unique differences, and appreciation for the role every health care employee plays in the healing of patients and their families. The patient and family experience is absolutely vital in quality, competent, compassionate health care.

MSCT21

Case-based Review of Thoracic Radiology (An Interactive Session)

Monday, Nov. 30 1:30PM - 3:00PM Location: S100AB

CH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Diana Litmanovich, MD, Haifa, Israel (*Director*) Nothing to Disclose

Sub-Events

MSCT21A Congenital Thoracic Pathology

Participants
Edward Y. Lee, MD, MPH, Boston, MA, (Edward.Lee@childrens.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the current imaging technique for evaluating congenital thoracic anomalies in infants and children. 2) Learn important clinical aspects and characteristic imaging features of various congenital thoracic anomalies in pediatric patients. 3) Discuss key imaging findings which allow differentiation among various congenital thoracic anomalies in infants and children.

MSCT21B Diffuse Lung Disease

Participants
Sujal R. Desai, MBBS, London, United Kingdom, (sujal.desai@nhs.net) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To become familiar with the key patterns of diffuse interstitial lung diseases on chest radiography and HRCT. 2) To understand the relationships between HRCT signs and histopathologic changes. 3) To become familiar with some of the common types of diffuse intersstitial lung diseases.

ABSTRACT

The diffuse lung diseases (DLDs) are an intriguing and challenging group of lung disorders in which a multidisciplinary approach to management is key. Imaging tests (and specifically, high-resolution computed tomography [HRCT]) are an important part of the evaluation of patients with suspected and established DLDs. A systematic approach to the diagnosis is important: an awareness of HRCT sign and the relationship between radiologic and histopathologic patterns is crucial. In addition to the differential diagnoses, this session will stress some of the important HRCT signs of DLDs and, where appropriate, the relationship with pathologic features.

MSCT21C Cystic Lung Disease

Participants
Andetta R. Hunsaker, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify dominant features in cystic lung disease and distinguish between their varied radiologic presentations. 2) Detect additional features in patients with cystic lung disease which will be helpful in diagnosis. 3) Differentiate between true cystic lung disease and mimickers such as bronchiectasis. 4) Reccomend appropriate follow-up based on the diagnosis

ABSTRACT

Abstract not needed.

MSMC23

Cardiac CT Mentored Case Review: Part III (In Conjunction with the North American Society for Cardiac Imaging) (An Interactive Session)

Monday, Nov. 30 1:30PM - 3:00PM Location: S406A

CA VA CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Pamela K. Woodard, MD, Saint Louis, MO (*Director*) Research Consultant, Bristol-Myers Squibb Company; Research Grant, Astellas Group; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Bayer AG; Research agreement, Siemens AG; Research Grant, Actelion Ltd; Research Grant, Guerbet SA; ; ;
Harold I. Litt, MD, PhD, Philadelphia, PA (*Moderator*) Research Grant, Siemens AG ; Research Grant, Heartflow, Inc;
U. Joseph Schoepf, MD, Charleston, SC, (schoepf@musc.edu) (*Moderator*) Research Grant, Bracco Group; Research Grant, Bayer AG; Research Grant, General Electric Company; Research Grant, Siemens AG; Research support, Bayer AG; ; ;

LEARNING OBJECTIVES

1) Identify cardiac and coronary artery anatomy. 2) Recognize cardiac disease processes, including coronary atherosclerosis, as diagnosed on CT. 3) Understand methods of cardiac CT and coronary CT angiography post-processing.

Sub-Events

MSMC23A Pulmonary Veins and Pericardial Disease

Participants
Jacobo Kirsch, MD, Weston, FL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe normal versus anomalous pulmonary venous anatomy. 2) Understand the imaging findings of complications of ablation for atrial fibrillation. 3) Describe abnormalities of the pulmonary veins identifiable on routine CT. 4) Identify the most common pericardial abnormalities evaluated with CT.

Honored Educators

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Jacobo Kirsch, MD - 2013 Honored Educator

MSMC23B Coronary Atherosclerosis III

Participants
Elliot K. Fishman, MD, Owings Mills, MD (*Presenter*) Research support, Siemens AG Advisory Board, Siemens AG Research support, General Electric Company Advisory Board, General Electric Company Co-founder, HipGraphics, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

The goal of this session is to learn how to interpret pathology involving the coronary arteries beyond the detection of coronary artery stenosis. Focus on exam acquisition protocols, study interpretation protocols, and minimizing radiation dose are addressed. Specific topics addressed will also include coronary artery aneurysm, myocardial bridging, anomalous coronary arteries as well as vasculitis. Potential pitfalls will be addressed and pearls for study optimization will also be discussed.

Honored Educators

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Elliot K. Fishman, MD - 2012 Honored Educator
Elliot K. Fishman, MD - 2014 Honored Educator

MSMI23

Molecular Imaging Symposium: Oncologic MI Applications

Monday, Nov. 30 1:30PM - 3:00PM Location: S405AB

GU MI MR OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Peter L. Choyke, MD, Rockville, MD, (pchoyke@nih.gov) (*Moderator*) Researcher, Koninklijke Philips NV Researcher, General Electric Company Researcher, Siemens AG Researcher, iCAD, Inc Researcher, Aspyrian Therapeutics, Inc Researcher, ImaginAb, Inc Researcher, Aura Biosciences, Inc
Umar Mahmood, MD, PhD, Charlestown, MA (*Moderator*) Research Grant, Sabik Medical Inc; Advisory Board, Blue Earth Diagnostics Limited;

LEARNING OBJECTIVES

1) To understand the role of molecular imaging in cancer therapy. 2) To understand the impact that new molecular imaging agents could have on drug development. 3) To understand the barriers facing the development of new molecular imaging agents.

ABSTRACT

Molecular Imaging is expanding in many new directions. Most research is being performed for PET and SPECT agents. However, optical and MRI agents are also being developed. Molecular Imaging can play a role in accelerating the development and approval of new cancer therapeutics by quantifying the impact drugs have in early Phase studies and by selecting the most appropriate patients for trials. Molecular Imaging agents can be useful in determining the utility and mechanism of actions of drugs that are already approved and may provide insights to oncologists regarding the best treatment combinations for individual patients. Molecular Imaging methods have already expanded our knowledge of cancer behavior and this will ultimately lead to new forms of the therapy that will one day cure this dreaded disease.

Sub-Events

MSMI23A Overview of MI in Oncology

Participants
Peter L. Choyke, MD, Rockville, MD, (pchoyke@nih.gov) (*Presenter*) Researcher, Koninklijke Philips NV Researcher, General Electric Company Researcher, Siemens AG Researcher, iCAD, Inc Researcher, Aspyrian Therapeutics, Inc Researcher, ImaginAb, Inc Researcher, Aura Biosciences, Inc

LEARNING OBJECTIVES

1) To understand the broad spectrum of activities in molecular imaging including PET, SPECT, optical and MRI. 2) To understand the potential impact of Molecular Imaging on cancer treatment.

ABSTRACT

Molecular Imaging is expanding at a rapid rate. This overview will provide a panoramic view of the field of Molecular Imaging and major trends that are emerging among the different modalities, PET, SPECT, optical, ultrasound and MRI that constitute molecular imaging.

MSMI23B Hyperpolarized MRI of Prostate Cancer

Participants
Daniel B. Vigneron, PhD, San Francisco, CA (*Presenter*) Research Grant, General Electric Company

LEARNING OBJECTIVES

View learning objectives under main course title.

MSMI23C Radiogenomics

Participants
Michael D. Kuo, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss the principles behind radgiogenomics and to highlight areas of clinical application and future development.

ABSTRACT

MSMI23D Somatastatin Receptor Imaging

Participants
Ronald C. Walker, MD, Nashville, TN, (ronald.walker@vanderbilt.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the advantages of 68Ga-somatostatin PET/CT over 111In-DTPA-octreotide imaging. 2) Detect patients likely to benefit from peptide receptor radiotherapy (PRRT).

ABSTRACT

68Ga-labeled somatostatin analogs (DOTATATE, DOTATOC and DOTANOC) PET/CT imaging provides higher resolution scans than 111In-DTPA-octreotide with less radiation, comparable cost, and imaging completion within 2 hours vs. 2-3 days. 68Ga-somatostatin analogs have a higher impact on care than 111In-DTPA-octreotide, including superior ability to identify patients likely to benefit from PRRT. This activity will provide results from the literature and the author's experience to illustrate the advantages of 68Ga-based PET/CT imaging of neuroendocrine tumors.

Active Handout:Ronald Clark Walker

http://abstract.rsna.org/uploads/2015/15003715/MSMI23D.pdf

MSMI23E Multimodal MI in Oncology

Participants
Umar Mahmood, MD, PhD, Charlestown, MA (*Presenter*) Research Grant, Sabik Medical Inc; Advisory Board, Blue Earth Diagnostics Limited;

LEARNING OBJECTIVES

1) To understand strengths of various imaging modalities for specific target/disease assessment.

ABSTRACT

Each imaging modality has a set of characteristics that helps define optimal use. These constraints include sensitivity, depth of imaging, integration time for signal, and radiation dose, among other factors. Understanding when each modality can be used and when combining the relative strengths of differerent modalities can be synergistic allows greater molecular information to be acquired.

SPPH21

AAPM/RSNA Basic Physics Lecture for the RT: Image Quality and Patient Dose in CT and Interventional Radiology

Monday, Nov. 30 1:30PM - 2:45PM Location: S402AB

PH

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Scott J. Emerson, MS, Royal Oak, MI, (scott.emerson@beaumont.org) (*Moderator*) Nothing to Disclose
Jerry A. Thomas, MS, Wichita, KS, (jerry.thomas@viachristi.org) (*Presenter*) Stockholder, General Electric Company; Stockholder, Hologic, Inc; Stockholder, Stryker Corporation; Speaker, Medical Technology Management Institute;

LEARNING OBJECTIVES

1) Describe the technical factors which affect patient dose and image quality in CT and IR. 2) Fully participate in CT protocol review and development of new imaging protocols. 3) Describe radiation dose optimization techniques for adult and pediatric patients in CT and IR. 4) Recognize unsafe procedures and operation of CT scanners. 5) Develop methods for ensuring compliance with TJC Diagnostic Imaging Standards in CT which became effective on 01 July 2015.

ABSTRACT

Changes in TJC Diagnostic Imaging Standards and public concern with radiation dose have heightened the awareness and fear of dose in Computed Tomography (CT) and Interventional Radiography (IR). Unfortunately, as these changes have come into effect, the importance of image quality and its relationship to radiation dose may have been overlooked. This session will review technical factors which affect Image Quality and Patient Dose in CT and IR. Emphasis will be placed on practical methods which may be used to develop appropriate imaging protocols. Dose triggers in CT and IR fluoroscopy, the meaning of ALARA applied to staff with expected exposure levels, associated radiation safety design in imaging rooms and personnel training required to assure a culture of safety and imaging excellence will be examined. Finally, suggestions will be provided on how to meet and comply with the new TJC Diagnostic Imaging Services Standard effective July 01, 2015 and NEMA Standards XR-25, 27 and 29.

SPPH22

Physics Symposium: Best of the SRS/SBRT AAPM Summer School

Monday, Nov. 30 1:30PM - 5:45PM Location: S102C

PH SQ

AMA PRA Category 1 Credits ™: 4.00
ARRT Category A+ Credits: 4.00

Participants

LEARNING OBJECTIVES

1) Identify critical anatomical features of major SRS/SBRT targets. 2) Learn techniques used in small field dosimetry and the order of magnitude of treatment uncertainties. 3) Learn essential treatment planning techniques, especially with regards to repiratory motion management. 4) Gain knowledge about treatment delivery devices for SRS/SBRT. 5) Understand resources and safety practices for SRS/SBRT.

ABSTRACT

This session summarizes the highlights of the 2014 AAPM Summer School on SRS/SBRT. The first speaker will highlight critical anatomical structures which physicists and treatment planners need to be aware of in SRS/SBRT. Contouring atlases specific to SRS/SBRT are discussed, e.g. the consensus guidelines published by the spine consortium. The second lecture focuses on the physics of small field dosimetry, which is a special skill set within the field of clinical medical physics. The state-of-the art recommendation on detector selection and measurement techniques will be discussed, including current recommendations on the use of detector correction factors. The third speaker will summarize treatment planning approaches specific to classic SRS/SBRT targets in the brain, lung, GI and GU regions. The appropriate use of respiratory management techniques for SBRT in lung, liver and pancreas requires the careful and considerate application of complex technology. Current society recommendations and peer-reviewed literature on accepted approaches to respiratory motion management will be summarized. In the last decade, the selection of treatment machines capable of delivering SRS/SBRT treatments with the required spatial and dosimetric accuracy has increased significantly. The speaker will discuss the major technical components of each delivery device, highlighting strength and weaknesses of each system as they apply to SRS/SBRT. SRS/SBRT delivers a high dose with steep dose gradients in 1-5 fractions, using complex technology with image guidance. Both the risk of error and the impact of errors is amplified under these circumstances. The last speaker of this session will discuss selected case reports of errors, including a root cause analysis. Current safety initiatives and recommendations for improved safety practices will be introduced. Resources to guide safe and effective implementation of an SRS/SBRT program will be discussed and shared with the audience.

Sub-Events

SPPH22A Anatomy for SRS/SBRT

Participants
Josh Y. Yamada, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under the main course title.

SPPH22B Small Field Dosimetry and Uncertainty

Participants
Sonja Dieterich, PhD, Sacramento, CA, (sdieterich@ucdavis.edu) (*Presenter*) Scientific Advisor, MGS Research, Inc

LEARNING OBJECTIVES

View learning objectives under the main course title.

ABSTRACT

This session summarizes the highlights of the 2014 AAPM Summer School on SRS/SBRT. The first speaker will highlight critical anatomical structures which physicists and treatment planners need to be aware of in SRS/SBRT. Contouring atlases specific to SRS/SBRT are discussed, e.g. the consensus guidelines published by the spine consortium. The second lecture focuses on the physics of small field dosimetry, which is a special skill set within the field of clinical medical physics. The state-of-the art recommendation on detector selection and measurement techniques will be discussed, including current recommendations on the use of detector correction factors. The third speaker will summarize treatment planning approaches specific to classic SRS/SBRT targets in the brain, lung, GI and GU regions. The appropriate use of respiratory management techniques for SBRT in lung, liver and pancreas requires the careful and considerate application of complex technology. Current society recommendations and peer-reviewed literature on accepted approaches to respiratory motion management will be summarized. In the last decade, the selection of treatment machines capable of delivering SRS/SBRT treatments with the required spatial and dosimetric accuracy has increased significantly. The speaker will discuss the major technical components of each delivery device, highlighting strength and weaknesses of each system as they apply to SRS/SBRT. SRS/SBRT delivers a high dose with steep dose gradients in 1-5 fractions, using complex technology with image guidance. Both the risk of error and the impact of errors is amplified under these circumstances. The last speaker of this session will discuss selected case reports of errors, including a root cause analysis. Current safety initiatives and recommendations for improved safety practices will be introduced. Resources to guide safe and effective implementation of an SRS/SBRT program will be discussed and shared with the audience.

Active Handout:Sonja Dieterich

http://abstract.rsna.org/uploads/2015/15001967/SPPH22B.pdf

Handout:Sonja Dieterich

http://abstract.rsna.org/uploads/2015/15001967/Dieterich SRS Dosimetry for RSNA FINAL.pptx

SPPH22C Treatment Planning and Respiratory Motion Management for SBRT

Participants
Kristi R. Hendrickson, PhD, Seattle, WA, (krgh@uw.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPPH22D SRS/SBRT Delivery Devices

Participants
James Gordon, PhD, Detroit, MI (*Presenter*) Departmental Research Grant, Varian Medical Systems, Inc; Departmental Research Grant, Koninklijke Philips NV

LEARNING OBJECTIVES

View learning objectives under main course title.

SPPH22E Safety and Quality for SRS/SBRT

Participants
Stanley H. Benedict, PhD, Sacramento, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Active Handout:Stanley H Benedict

http://abstract.rsna.org/uploads/2015/15001972/SPPH22E.pdf

VSIO21

Interventional Oncology Series: Hepatocellular Carcinoma

Monday, Nov. 30 1:30PM - 6:00PM Location: S406B

GI IR OI RO

AMA PRA Category 1 Credits ™: 4.25
ARRT Category A+ Credits: 5.00

FDA Discussions may include off-label uses.

Participants
Riccardo A. Lencioni, MD, Pisa, Italy (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn the indications for image-guided ablation and transcatheter-based therapies for patients with HCC. 2) To understand the potential limitations, pitfalls, side effects and toxicities associated with ablative and transcatheter therapies for patients with HCC. 3) To know the results, imaging responses and survival benefit of various ablative and transcatheter therapies. 4) To know the future ablative and transcatheter therapies and understand their potential. 5) To learn the various combination therapies available and undergoing clinical evaluation for HCC.

ABSTRACT

Sub-Events

VSIO21-01 Epidemiology, Staging, and Medical Therapy

Monday, Nov. 30 1:30PM - 1:50PM Location: S406B

Participants
Ghassan K. Abou-Alfa, MD, New York, NY (*Presenter*) Research Grant, Abbott Laboratories; Research Grant, Amgen Inc; Research Grant, AstraZeneca PLC; Research Grant, Bayer AG; Research Grant, Eli Lilly and Company; Research Grant, Exelixis, Inc; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Immunomedics, Inc; Research Grant, Incyte Corporation; Research Grant, Momenta Pharmaceuticals; Research Grant, Myriad Genetics, Inc; Research Grant, Novartis AG; Research Grant, OncoMed Pharmaceuticals, Inc; Research Grant, Polaris Group; Research Grant, Vicus Therapeutics, LLC; Consultant, Aduro BioTech, Inc; Consultant, Astellas Group; Consultant, Onxeo SA; Consultant, Boston Scientific Corporation; Consultant, Boston Therapeutics, Inc; Consultant, Bristol-Myers Squibb Company; Consultant, CASI Pharmaceuticals Inc; Consultant, Celgene Corporation; Consultant, Cipla Ltd; Consultant, Eli Lilly and Company; Consultant, Gilead Sciences, Inc; Consultant, IntegraGen SA; Consultant, AstraZeneca PLC; Consultant, Merrimack Pharmaceuticals, Inc; Consultant, Momenta Pharmaceuticals; Consultant, Novartis AG; Consultant, Onxeo SA; Consultant, AbbVie Inc; Consultant, sanofi-aventis Group; Consultant, Silenseed Ltd; Consultant, SillaJen, Inc; Consultant, Vicus Therapeutics, LLC

LEARNING OBJECTIVES

1) Recognize the increasing incidence of HCC in the Western Hemisphere. 2) Learn about scoring the cirrhosis and staging the cancer. 3) Identify sorafenib as the standard care treatment for advanced HCC.

VSIO21-02 Critical Evaluation and Validation of the 9-Stage Hong Kong Liver Cancer Staging System in North American Hepatocellular Carcinoma Patients Who Underwent TACE

Monday, Nov. 30 1:50PM - 2:00PM Location: S406B

Participants
Jae Ho Sohn, MD,MS, New Haven, CT (*Presenter*) Nothing to Disclose
Rafael Duran, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Julius Chapiro, MD, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Yan Zhao, MS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Florian N. Fleckenstein, MS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Sonia P. Sahu, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Howard Lee, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ruediger E. Schernthaner, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Li Zhao, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation

PURPOSE

The new Hong Kong Liver Cancer (HKLC) staging offers 9-stage and 5-stage classification for survival and treatment allocation for hepatocellular carcinoma (HCC), thought to be superior to the Barcelona Clinic Liver Cancer (BCLC) staging. A known limitation of the HKLC staging is the need for validation in non-HBV patient cohort. The purpose of this study is to compare the 9-stage HKLC against BCLC staging in a North American cohort and then identify any needs for improvement.

METHOD AND MATERIALS

968 HCC patients at a single institution who underwent TACE were retrospectively reviewed. 890 had sufficiently complete record to calculate the 9-stage HKLC and BCLC stages. Overall survival (OS) from date of first TACE to death or last note date was recorded. The performances of the HKLC and BCLC systems were compared through homogeneity, survival discrimination, monotonicity of gradients, and reduction in error of survival prediction. The staging systems were evaluated through Kaplan-Meier

(KM) estimate, Cox model's likelihood ratio (LHR), linear trend (LT), Harrell's C, Akaike's information criterion (AIC), and % error reduction in survival.

RESULTS

The HCC etiologies in this cohort included 132 (14.8%) hepatitis B, 427 (48.0%) hepatitis C, 254 (28.5%) alcoholic, 60 (7.8%) NASH, and 60 (6.7%) no identifiable cause (some patients with overlapping etiologies). Median OS in months for HKLC were I (62.6), IIa (35.8), IIb (24.3), IIIa(12.3), IIIb (10.9), IVa (11.0), IVb (4.3), Va (10.5), and Vb (2.7), notable for similarity in OS among a few stages. Median OS for BCLC were A (51.6), B (24.3), C (12.2), and D (4.3). The 9-stage HKLC performed better on all statistical measures. Better homogeneity was found for HKLC (LHR: 249) than BCLC (LHR: 119). Superior survival discrimination was shown for HKLC (C=0.72, AIC=6200) than BCLC (C=0.64, AIC=6320). Monotonicity was better in HKLC (LT: 261) than in BCLC (LT: 111). Reduction in error of prediction for HKLC was 15.9% while BCLC was 11.8%.

CONCLUSION

The 9-stage HKLC staging system outperformed the BCLC staging system as a prognostic classification system on overall statistical measures, but similarity in survival for stages IIIa/b, IVa, and Va should be further explored and addressed.

CLINICAL RELEVANCE/APPLICATION

The HKLC staging system may become the next HCC staging system of choice after addressing some of the identified issues and completing further validations.

VSIO21-03 TACE Techniques, Indications, and Results: Western Perspective

Monday, Nov. 30 2:00PM - 2:20PM Location: S406B

Participants
Jean-Francois H. Geschwind, MD, Westport, CT (*Presenter*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation

LEARNING OBJECTIVES

1) To understand the indications for TACE and describe the various technical issues and clinical results of TACE.

VSIO21-04 Does DEB-TACE Enhance the Local Effect of IRE? Imaging and Histopathological Evaluation in a Porcine Model

Monday, Nov. 30 2:20PM - 2:30PM Location: S406B

Participants
Peter Isfort, MD, Aachen, Germany (*Presenter*) Nothing to Disclose
Philip Rauen, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Hong-Sik Na, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Nobutake Ito, MD, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose
Christoph Wilkmann, DIPLENG, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Christiane K. Kuhl, MD, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Philipp Bruners, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Irreversible electroporation (IRE) is associated with a hypervascular penumbra of vital temporarily damaged tissue due to reversible electroporation. Transarterial treatment of this penumbra could increase local efficacy of IRE. We conducted an in-vivo trial on swine to compare the ablation volumes of an IRE/DEB-TACE combination vs. IRE-only.

METHOD AND MATERIALS

Nine swine underwent IRE in one liver lobe and DEB-TACE immediately followed by IRE in a different liver lobe. For DEB-TACE, 100-300 µm beads (DC-Beads®) were loaded with 50mg doxorubicin. For IRE, the NanoKnife® was used with two IRE electrodes according to the vendor's recommended protocol. After one day (n=3), three days (n=3) and seven days (n=3) animals were sacrificed, and ablation volumes were evaluated histopathologically. Imaging follow-up was performed using contrast-enhanced CT and MRI. Lesion volumes were measured one day (n=9), three days (n=6) and 7 days (n=3) after the procedure.

RESULTS

Mean histopathological ablation volume of IRE/DEB-TACE combination lesions after one, three and seven days were 15.7 ± 11.1 ml, 11.8 ± 9.3 ml and 4.2 ± 1.4 ml. Mean histopathological ablation volumes of IRE-only lesions after one, three and seven days were 7.2 ± 4.5 ml, 4.0 ± 1.0 ml and 1.7 ± 1.5 ml. In intra-individual comparison the ablation volumes of the IRE/DEB-TACE combination group were on average 199.6 %, 163.4% and 98.5% larger than IRE-only lesions after one, three and seven days.

CONCLUSION

Combination of IRE followed by DEB-TACE resulted in larger ablation volumes compared to IRE alone suggesting that local efficacy of IRE can be enhanced by post-IRE DEB-TACE.

CLINICAL RELEVANCE/APPLICATION

Results suggest that local efficacy of IRE can be enhanced when additional DEB-TACE is performed in the target liver segment after ablation.

VSIO21-05 TACE Techniques, Indications, and Results: Eastern Perspective

Monday, Nov. 30 2:30PM - 2:50PM Location: S406B

Participants

Yasuaki Arai, Tokyo, Japan (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe the various techniques and approaches used in TACE treatment. 2) To understand the indications and results of TACE in the treatment of HCC. 3) To discuss differences and similiarities between Eastern and Western approaches in TACE.

VSIO21-06 Anti-tumor Effects of TAE Administered in Combination with Sorafenib in a Rabbit VX2 Liver Tumor Model

Monday, Nov. 30 2:50PM - 3:00PM Location: S406B

Participants
Yuki Tomozawa, MD, Otsu, Japan (*Presenter*) Nothing to Disclose
Norihisa Nitta, MD, Kyoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Shinichi Ohta, MD, PhD, Otsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Shobu Watanabe, MD, Otsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Akinaga Sonoda, MD, PhD, Otsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Ayumi N. Seko, Otsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Keiko Tsuchiya, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Kiyoshi Murata, MD, Otsu, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

A number of studies have been reported that a combination of Sorafenib with TACE has been a more effective treatment than Sorafenib or TACE alone in addition to being tolerable. Using a VX2 liver tumor model, we investigated the most suitable timing parameters when using Sorafenib to enhance the anti-tumor effects of TAE.

METHOD AND MATERIALS

20 Japanese white rabbits were randomly assigned to four equal groups two weeks after of VX2 tumor transplantation to the liver. We then performed the combination treatment with Sorafenib and TAE on the four groups in the according ways; Group 1(TAE prior to administration of Sorafenib), Group 2(TAE on the second day after administration of Sorafenib), Group 3(TAE on the fourth day after administration of Sorafenib) and Group 4(TAE after the end of administrating Sorafenib). Sorafenib (40mg/day) was orally administrated for consecutive 7 days starting on the day two week after tumor implantation. The anti-tumor effects were assessed by comparing the pre- and post-treatment tumour volumes measured on a contrast-enhanced CT scans and by immuno-histochemical analysis of the number of intra-tumoral vessels two weeks after the treatment.

RESULTS

Among the four groups, the tumor growth rate tended to be lower in Group 1 and Group 2 than in Group 3 and Group 4. The difference between Group 1 and Group 3 was significant. The number of CD31-positive intra-tumor vessels in specimens tended to be higher in Group 3 than in the other groups, although there was no significant difference.

CONCLUSION

We suggest that the ideal time of TAE is prior to or early after commencement of administration Sorafenib.

CLINICAL RELEVANCE/APPLICATION

To date, limited data has focused on the timing parameters when Sorafenib is combined with TACE.

VSIO21-07 Y90 Radioembolization: What We Know, and What We Need to Know

Monday, Nov. 30 3:00PM - 3:20PM Location: S406B

Participants
Riad Salem, MD, MBA, Chicago, IL (*Presenter*) Research Consultant, BTG International Ltd; Research Grant, BTG International Ltd; ;

LEARNING OBJECTIVES

1) To describe techniques and approaches used for Y90 treatment of liver cancers. 2) To understand the available data for Y90 in the treatment of primary and metastatic liver tumors. 3) To discuss current gaps in knowledge and ongoing clinical studies.

VSIO21-08 Predicting the Hepato-pulmonary Shunt Fraction Using 3D Quantification of Tumor Enhancement on Contrast-enhanced CT Imaging in Patients with Hepatocellular Carcinoma before Y90 Radioembolization

Monday, Nov. 30 3:20PM - 3:30PM Location: S406B

Participants
Julius Chapiro, MD, Berlin, Germany (*Presenter*) Nothing to Disclose
David Wainstejn, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Duc Do Minh, BSc, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Christoph Erxleben, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation
Dirk Schnapauff, MD, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Bernd K. Hamm III, MD, Berlin, Germany (*Abstract Co-Author*) Research Consultant, Toshiba Corporation; Stockholder, Siemens AG; Stockholder, General Electric Company; Research Grant, Toshiba Corporation; Research Grant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, General Electric Company; Research Grant, Elbit Imaging Ltd; Research Grant, Bayer AG; Research Grant, Guerbet SA; Research Grant, Bracco Group; Research Grant, B. Braun Melsungen AG; Research Grant, KRAUTH medical KG; Research Grant, Boston Scientific Corporation; Equipment support, Elbit Imaging Ltd; Investigator, CMC Contrast AB

Bernhard Gebauer, MD, Berlin, Germany (*Abstract Co-Author*) Research Consultant, C. R. Bard, Inc; Research Consultant, Sirtex Medical Ltd; Research Grant, C. R. Bard, Inc; Research Consultant, PAREXEL International Corporation;
Federico Collettini, MD, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

This study explored the ability of 3D quantitative CT image analysis to predict the hepato-pulmonary shunt fraction (HPSF) in patients with hepatocellular carcinoma (HCC) before Yttrium90 (Y90) radioembolization.

METHOD AND MATERIALS

This IRB-approved, retrospective analysis included a total of 26 patients with HCC, who underwent an evaluation study to calculate the HPSF from SPECT/CT after infusion of Tc-99m macroaggregated albumin into the proper hepatic artery. All patients underwent tri-phasic contrast-enhanced CT imaging within six weeks before the evaluation study. A semi-automatic, segmentation-based 3D quantification of the total tumor volume (TTV) was used to calculate the enhancing tumor volume (ETV), measured in cm3 and as a relative ratio (%; TTV/ETV). TTV as well as ETV were correlated with the HPSF for each patient. Statistical analysis included the One-way ANOVA test and linear regression analysis to calculate the R2 values.

RESULTS

N=24 (92%) patients had preserved liver function (Child-Pugh A) and N=2 (8%) had Child-Pugh B. The mean HPSF was 13.5% (Range, 2.9-32.8; SD, 7.4) and the mean TTV was 569cm3 (Range, 18-2998; SD, 584). The mean absolute ETV was 120cm3 (Range, 7-431; SD, 116) and the mean relative ETV was 28% (Range, 6-60; SD, 19). A low correlation between TTV and the HPSF was observed (R2=0.29) and relative ETV (%) showed no correlation with the HPSF (R2<0.1). However, some correlation between the absolute ETV (cm3) and the HPSF was observed (R2=0.59). More importantly, patients with HPSF≤10% showed significantly lower mean ETVs as compared to patients with a HPSF≥10% (53cm3; Range, 7-96; SD, 21 vs. 187cm3, Range, 104-431; SD, 87, p<0.0001). No patient with HPSF≤10% exceeded the ETV of 100cm3. No statistically significant differences were observed for TTV and relative ETV (%).

CONCLUSION

The quantification of the absolute ETV (cm3) using semi-automatic 3D tools allows for an estimation of the HPSF in patients with HCC before Y90 Radioembolization. TTV and relative ETV (%) did not appear as reliable predictors of the HPSF.

CLINICAL RELEVANCE/APPLICATION

These preliminary results may introduce absolute ETV (cm3) as a new imaging biomarker for HPSF, potentially allowing to narrow down the selection of patients who will undergo shunt evaluation studies prior to Y90 radioembolization.

VSIO21-09 Response Assessment and the Concept of Treatment Failure

Monday, Nov. 30 3:30PM - 3:50PM Location: S406B

Participants
Riccardo A. Lencioni, MD, Pisa, Italy (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn the imaging criteria used for response assessment in patients with HCC. 2) To understand the limitations and the pitfalls associated with conventional response evaluation models. 3) To know the basic concepts of modified RECIST (mRECIST) criteria and how response predicts survival. 4) To understand the concept of treatment failure in patients undergoing loco-regional therapies. 5) To learn the novel volumetric response criteria currently undergoing clinical evaluation.

ABSTRACT

VSIO21-10 Which Response Criteria can Predict Early Tumor Progression in Hepatocellular Carcinoma Patients Treated with Conventional TACE: RECIST, mRECIST, EASL or qEASL?

Monday, Nov. 30 3:50PM - 4:00PM Location: S406B

Participants
Yan Zhao, MS, Baltimore, MD (*Presenter*) Nothing to Disclose
Sonia P. Sahu, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Wei Bai, Xian, China (*Abstract Co-Author*) Nothing to Disclose
Rafael Duran, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Zhanxin Yin, Xian, China (*Abstract Co-Author*) Nothing to Disclose
Jae Ho Sohn, MD,MS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ruediger E. Schernthaner, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Guohong Han, Xian, China (*Abstract Co-Author*) Nothing to Disclose
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation

PURPOSE

In this preliminary study, we compared the ability of RECIST, modified RECIST (mRECIST), EASL and quantitative EASL [(qEASL), a volumetric enhancement criterion] to assess early tumor progression after transarterial chemoembolization (TACE) in hepatocellular carcinoma (HCC) patients.

METHOD AND MATERIALS

A total of 53 consecutive patients (77.4% men; mean age, 51 years) with intermediate-stage HCC were included. All patients underwent conventional TACE and contrast-enhanced computed tomography (CT) scan at baseline and 1 month after TACE. Tumor response was determined by RECIST, mRECIST, EASL, and qEASL on CT. qEASL classifies progression as ≥73% increase in

enhancing tumor volume. The Kaplan-Meier method with the log-rank test was used to compare median overall survival (OS) between progression and non-progression.

RESULTS

Median follow-up period was 15.4 months (range 1.2-54.1).The mean value of enhancing tumor volume (qEASL) at baseline and post-treatment were 214± 263.5 cm3 and 58.5 ± 21.9 cm3, respectively. RECIST, mRECIST and EASL, identified progression in 2 (4%), 1(2%) and 2 (4%) patients at 1 month after TACE treatment. Notably, qEASL had a higher sensitivity for early tumor progression and it identified 9 (17%) patients with progression. Too few patients showed progression to perform survival analysis for the RECIST, mRECIST, and EASL. However, the patients who experienced progression according to qEASL demonstrated a significantly shorter median OS than those with non-progression [6.5 months (95%CI 4.2-8.8) vs. 21.1 months (95%CI 14.1-28.1), P<0.001].

CONCLUSION

qEASL is a more sensitive biomarker for tumor progression and survival than RECIST, mRECIST and EASL one month after TACE in hepatocellular carcinoma patients.

CLINICAL RELEVANCE/APPLICATION

Defining early tumor progression may help guide the decisions of further treatment. qEASL gave a better discrimination for early progression than other 1D or 2D criteria

VSIO21-11 Panel Discussion: Management of Intermediate-Advanced HCC in 2015

Monday, Nov. 30 4:00PM - 4:20PM Location: S406B

Participants

VSIO21-12 The Effect of Sociodemographic Determinants of Receipt of Cancer Directed Therapy on Survival and Therapeutic Efficacy in AJCC Stage I and II Unresectable Hepatocellular Carcinoma: A SEER-Medicare Population Study

Monday, Nov. 30 4:30PM - 4:40PM Location: S406B

Participants
Nima Kokabi, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Minzhi Xing, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Richard Duszak JR, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Kimberly E. Applegate, MD, MS, Zionsville, IN (*Abstract Co-Author*) Nothing to Disclose
Juan C. Camacho, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
David H. Howard, PhD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Hyun S. Kim, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the socio-demographic determinants of receipt of HCC-directed locoregional therapies (LRT's) and comparative effectiveness of different therapies in American Joint Commission on Cancer (AJCC) Stage I and II unresectable hepatocellular carcinoma (HCC) using Surveillance Epidemiology and End Results (SEER) registries linked to Medicare database.

METHOD AND MATERIALS

Patients diagnosed with HCC during 2000 to 2010 were identified with unresectability defined using "no cancer-directed surgery recommended" and no HCC directed surgical claim. Patients were stratified by AJCC staging and the following therapies: ablation, trans-arterial chemoembolization (TACE), Yttrium-90 (Y90) radioembolization, sorafenib, systemic chemotherapy (CTX), external beam radiation (EBRT) or no cancer directed therapy (NCDT). Sociodemographic predictors of receipt of LRT's (i.e. TACE and Y-90) were evaluated by chi-square. Overall survival (OS) was estimated using Kaplan-Meier analysis.

RESULTS

Total of 9,169 patients with unresectable HCC were identified with the followings staging composition: I (25%), II (10%), III (13%), IV (17%), and unstaged (35%). All therapies demonstrated OS benefit compared to no therapy with the following median OS (months): ablation (30.8), Y90 (15.6), TACE (15.5), EBRT (7.6), Sorafenib (5.6), CTX (5.10), NCDT (3.7; p<0.001). One year survival rate of stage I and II patients treated with TACE was 67% and 53% vs. 27% and 14% for NCDT respectively (p<0.001). Overall, 38% of patients received any cancer directed therapy including TACE (18%), EBRT (8%), sorafenib (4%), ablation (3%), and Y-90 (2%) and CTX (1%). Specifically, 56% and 65% of stage I and II patients had NCDT respectively. There was no OS difference between TACE and Y90 group (p=0.31). There was a significantly prolonged OS in LRT group vs. EBRT/CTX groups (p<0.001) and the LRT vs. NCDT group (p<0.001). The receipt of LRT significantly correlated with being married and of Asian decent, living on the pacific coast and in urban areas, being insured with higher income and education levels (p's <0.05).

CONCLUSION

Favorable sociodemopgraphic factors were determinant of receipt of HCC directed LRT's. Less than 50% of of Stage I and II patients received LRT's. LRT's in Stage I and II significantly prolonged survivals over CTX/EBRT/NCDT.

CLINICAL RELEVANCE/APPLICATION

There is a national underutilization of effective HCC directed LRT's in patients with unresctable HCC.

VSIO21-13 Image-guided Ablation: Does Novel Technology Mean Better Outcomes?

Monday, Nov. 30 4:40PM - 5:00PM Location: S406B

Participants
Stephen B. Solomon, MD, New York, NY (*Presenter*) Research Grant, General Electric Company

LEARNING OBJECTIVES

1) To describe techniques and approaches used for image-guided ablation. 2) To understand the available data for novel thermal and non-thermal technologies. 3) To discuss strategies to improve clinical outcomes.

VSIO21-14 Hepatocellular Ccrcinomas Treated with Percutaneous Ablation Using a High-power Microwave System with a Single Antenna: 5 Years' Experience

Monday, Nov. 30 5:00PM - 5:10PM Location: S406B

Participants
Giovanni Mauri, MD, San Donato Milanese, Italy (*Presenter*) Consultant, Esaote SpA
Luca Cova, MD, Busto Arsizio, Italy (*Abstract Co-Author*) Nothing to Disclose
Tiziana Ierace, MD, Busto Arsizio, Italy (*Abstract Co-Author*) Nothing to Disclose
S. Nahum Goldberg, MD, Ein Kerem, Israel (*Abstract Co-Author*) Consultant, AngioDynamics, Inc; Research support, AngioDynamics, Inc; Research support, Cosman Medical, Inc; Consultant, Cosman Medical, Inc;
Luigi Solbiati, MD, Busto Arsizio, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To report our 5 year experience treating hepatocellular carcinoma (HCC) using a third-generation high-power microwave system and a single antenna.

METHOD AND MATERIALS

From 2009, 223 HCCs (mean 2.2 cm, size range 0.7-5.5 cm) in 109 patients (mean age 67.7 ± 6.2 years) underwent US-guided ablation using a high-power (140 Watt, 2.45 GHz) microwave system (AMICA-Probe: Hospital Service, Aprilia, Italy) with a single insertion of an internally-cooled antenna. Power and time of energy application ranged between 45-100 Watts and 4-10 min, respectively. Follow-up from a minimum of 1 year to 6 years (mean: 2.2yr) was performed with contrast-enhanced CT at 4-6 months intervals. Results were classified according to index tumor size (<=2cm; 2.1-3 cm; > 3 cm). Chi Square test was used for comparison.

RESULTS

Immediate complete ablation (i.e. technical success) was achieved in 221/223 (99.1%) HCCs. Local tumor progression within 1 year from ablation occurred in 23/223 (10.3%) HCCs: 4/103 (3.9%) <= 2cm; 8/68 (11.8%) sized 2.1-3 cm; and 11/52 (21.2%) > 3 cm ($p = 0.003$). In 9/23 (39.1%) HCCs, local progression underwent successful re-treatment. Major complications occurred in 6/151 (4.0%) ablation sessions and only 2 required surgical repair. No deaths related to ablation were seen. In 29/109 (26.6%) patients, new HCCs were detected on follow-up.

CONCLUSION

With an affordable and efficient high-power microwave system, local control of HCCs can be safely achieved in the vast majority of cases with the simplest and fastest technique, i.e. single insertion of single antenna.

CLINICAL RELEVANCE/APPLICATION

Percutaneous ablation with a high-power, affordable microwave system allows successfully treatment for a large majority of HCCs using a simple technique of single insertion of a single antenna with a short energy deposition time.

VSIO21-15 TACE Segmentectomy for Small, Solitary HCC: Just for the Unfit for Resection and Ablation?

Monday, Nov. 30 5:10PM - 5:30PM Location: S406B

Participants
Jin Wook Chung, MD, Seoul, Korea, Republic Of (*Presenter*) Research Grant, BTG International Ltd

LEARNING OBJECTIVES

1) Describe the current role of TACE for small solitary HCC in the routine daily practice. 2) Explain the technical aspects of subsegmental or ultraselective TACE. 3) Estimate curative potential of subsegmental TACE for small solitary HCC. 4) Appraise the role of subsegmental TACE for small solitary HCC.

VSIO21-16 A Prospective Study of the Safety and Efficacy of Small Caliber Drug-Eluting Beads in TACE for the Treatment of Hepatocellular Carcinoma

Monday, Nov. 30 5:30PM - 5:40PM Location: S406B

Participants
Sonia P. Sahu, New Haven, CT (*Presenter*) Nothing to Disclose
Rafael Duran, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ruediger E. Schernthaner, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Yan Zhao, MS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Jae Ho Sohn, MD,MS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation

PURPOSE

There has been a growing interest in smaller caliber beads which can penetrate deeper into tumors for transarterial chemoembolization (TACE). This prospective clinical trial examined the safety and efficacy of TACE using 70-150 μm doxorubicin-eluting beads (LC BeadM1,BTG, UK) in patients with hepatocellular carcinoma (HCC).

METHOD AND MATERIALS

This single-center prospective study was HIPPA compliant and IRB approved. Patients with HCC who were locoregional therapy naïve, Eastern Cooperative Oncology Group performance status 0-2, Barcelona Clinic Liver Cancer stage A-C, and Child-Pugh A-B were eligible. Adverse events were graded by severity and in relationship to TACE using CTCAE V4.03. Tumor response at 1 month follow-up was assessed by modified RECIST (mRECIST), European Association for the Study of the Liver (EASL), and volumetric tumor enhancement [quantitative EASL (qEASL)] on T1-weighted contrast-enhanced MR. qEASL response was defined as ≥65% decrease in volumetric tumor enhancement.

RESULTS

24 patients (men: 21, median age: 62 years) with a mean tumor size of 4.28 cm (range: 1.2 - 21.2) were enrolled and successfully treated with TACE. 2 serious adverse events unrelated to TACE occurred in 2 patients [upper GI bleed (n=1) and cardiac arrest (n=1)]. Possible to definitive device related toxicities were seen in 10 patients and were all grade 1-2 in severity [hypoalbuminemia (n=3), pain (n=3), elevated AP (n=2), headache (n=2), fatigue (n=2), leukopenia (n=1), anemia (n=1), anorexia (n=1), elevated AST (n=1), fever (n=1), flu-like symptoms (n=1), hyperbilirubinemia (n=1), weight loss (n=1)]. One month tumor response was assessed in 21 patients [died before follow-up (n=1), pending follow-up (n=2)]. 10 (45.5%) patients were classified as responders regardless of the criteria utilized.

CONCLUSION

TACE with 70-150 µm doxorubicin-eluting beads was well tolerated and had good tumor response after 1 month in patients with HCC.

CLINICAL RELEVANCE/APPLICATION

Smaller caliber 70-150 µm doxorubicin-eluting beads are a safe and promising alternative to the conventional sized 100-500 µm beads in TACE for patients with hepatocellular carcinoma

VSIO21-17 **HCC Tumor Board**

Monday, Nov. 30 5:40PM - 6:00PM Location: S406B

Participants

RCA24

National Library of Medicine: PubMed Tools: Save Searches and Create Personalized Search Options (Hands-on)

Monday, Nov. 30 2:30PM - 4:00PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Wendy Wu, MS, Detroit, MI (*Presenter*) Nothing to Disclose
Holly Ann Burt, MLIS, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Personalize PubMed by saving search strategies and creating email alerts. 2) Use My NCBI filters to link to library full-text articles and to focus PubMed searches. 3) Save collections of citations including a personal bibliography.

ABSTRACT

In this hands-on workshop session, explore the free My NCBI tool in PubMed. Discover how to develop and save search strategies, create email alerts on your research topics, and build permanent online bibliographies. With your My NCBI account, add permanent library filters and evidence-based filters to PubMed, use My Bibliography to create an online list of personal publications, limit searches to high impact journals, and utilize the link between the NIH Manuscript Submission System and PubMed. The National Library of Medicine (NLM) provides free web access to nearly 25 million citations for biomedical and clinical medical articles through PubMed.gov; MEDLINE is a subset of PubMed.

Handout:Holly Ann Burt

http://abstract.rsna.org/uploads/2015/15004106/2015myncbiRSNA.pdf

RCB24

3D Printing and 3D Modeling with Free and Open-Source Software (Hands-on)

Monday, Nov. 30 2:30PM - 4:00PM Location: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Michael W. Itagaki, MD, MBA, Seattle, WA (*Presenter*) Owner, Embodi3D, LLC
Tatiana Kelil, MD, Boston, MA (*Presenter*) Nothing to Disclose
Beth A. Ripley, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To become familiar with the steps of converting a medical imaging scan in standard Digital Imaging and Communications in Medicine (DICOM) format into a 3D printable medical model. 2) to obtain hands-on experience using free, open-source software packages to perform each step.

ABSTRACT

This presentation will provide hands-on training for converting a medical imaging scan into a 3D printed medical model using free, open-source software. Participants will convert a real computed tomography image data set in Digital Imaging and Communications in Medicine (DICOM) format to stereolithography (STL) file format using the open-source software package 3D Slicer. Participants will then further manipulation the STL file in preparation for 3D printing using the open-source software package Blender. By the end of the session participants should have a medical model that is 3D printable. Additional free learning resources for more advanced medical 3D printing will be provided. Techniques and software packages discussed will work on Windows, Macintosh, and Linux platforms.

Active Handout:Michael Ward Itagaki

http://abstract.rsna.org/uploads/2015/15003497/Active RCB24.pdf

RCC24

Overview of RSNA's Teaching File Software (MIRC®)

Monday, Nov. 30 2:30PM - 4:00PM Location: S501ABC

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
William J. Weadock, MD, Ann Arbor, MI (*Presenter*) Owner, Weadock Software, LLC
Stacy D. O'Connor, MD, Boston, MA (*Presenter*) Nothing to Disclose
Andre M. Pereira, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the features of the RSNA's MIRC software for teaching files. 2) Learn how to download and install the software. 3) Learn to use the RSNA MIRC Wiki to obtain documentation on the software.

ABSTRACT

Background:MIRC (Medical Imaging Resource Center) or TFS (Teaching File System) is a component of RSNA's CTP (Clinical Trials Processor), a suite of tools developed by RSNA to optimize research in radiology mainly with emphasis on:workflow and security of patient information. It is offered free of charge by RSNA.Simply put, MIRC can be:used to build a radiology teaching file, be it for an individual of for an institution with many simultaneous users.Development started in 2000 and the project has been kept alive along the years, funded by RSNA, with great support both from RSNA and from the community of users.Installation is very streamlined and available for virtually all plataforms and operational systems. All files necessary for installation are available at the download session of RSNA's own MIRC server (http://mirc.rsna.org).This course is aimed to cover the basics of installation and administration of MIRC and also basic and advanced authoring tools.After finishing this course the attendee will be proficient in authoring and uploading cases, and also be familiar with the resources for installation and administration of MIRC.Course outline:The following topics will be covered:1) MIRC overview2) Options of hardware3) MIRC Installation4) MIRC administration: setting up libraries.5):MIRC administration: adding users6) Authoring a case using the basic authoring tool.7) Authoring a case using the advanced authoring tool.8) Advanced authoring tools: image annotation, quizzes, adding documents.9) Other user-level tools: conferences, migrating cases stored in local folders10) Sending cases to MIRC straight from the Dicom viewer.After the talk the attendees will be granted access to an educational MIRC server which will be open for a full month after the conference, to practice authoring and uploading of cases.

MSRO23

BOOST: Gynecology-Case-based Review (An Interactive Session)

Monday, Nov. 30 3:00PM - 4:15PM Location: S103AB

GU RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Kevin V. Albuquerque, MD, MS, Dallas, TX, (kevin.albuquerque@utsouthwestern.edu) (*Presenter*) Nothing to Disclose
April A. Bailey, MD, Dallas, TX (*Presenter*) Nothing to Disclose
Stephen Thomas, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Yasmin Hasan, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Present the multimodality management of selected gynecolgic cancers including surgery, radiation and chemotherapy. 2) Highlight the importance of imaging in the diagnosis and followup of gynecologic cancers. 3) Highlight the importance of imaging in the planning and delivery of radiation.

ABSTRACT

The care of patients with gynecologic cancers requires the collaboration of imaging specialists as well as gynecologic and radiation oncologists. Radiologic imaging is key in defining disease at diagnosis and following patients for detection of recurrence after treatment. In conjunction with computerised planning , sectional imaging allows for sophisticated planning of external beam and brachytherapy and is key in maximizing the benefits of radiation while minimizing the risks. Case examples of the pivotal impact of imaging and its importance in multidisciplinary care will be highlighted in this session

MSRO26

BOOST: Head and Neck-Case-based Review (An Interactive Session)

Monday, Nov. 30 3:00PM - 4:15PM Location: S103CD

HN NR RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Suresh K. Mukherji, MD, Northville, MI (*Presenter*) Nothing to Disclose
Sung Kim, MD, New Brunswick, NJ (*Presenter*) Nothing to Disclose
Carol R. Bradford, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Francis P. Worden, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review common tumors of the head and neck. 2) Review imaging findings in head and neck malignancies that specifically change staging. 3) Review the value of imaging in directly affecting management and treatment.

ABSTRACT

This session will be tumor board that includes a head and neck radiologist, head and neck surgeon, medical oncologist and radiation oncologist. We will discuss a variety of head and neck cancer cases and illustrate the value-added benefits and highlight of imaging affects staging, treatment and management.

SPEP21

Planning Today for a Better Tomorrow

Monday, Nov. 30 3:00PM - 5:30PM Location: E253AB

OT

CME credit is not available for this session.
ARRT Category A+ Credit: 0

Participants
Alicia K. Waltenberger, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Fundamentals of conventional estate planning for any financial situation. 2) Planning strategies for income and estate taxes, and charitable giving. 3) Sophisticated strategies to leverage taxable gifts and transfer wealth to lower generations.

ABSTRACT

It is important to understand the fundamentals of estate planning and the importance of having a solid plan in place regardless of your financial situation. The desire to be tax efficient and keep up with the changing tax environment can sometimes feel like an insurmountable feat. In this seminar, we will explore a number of issues in the financial and tax planning arena including: o Income and Estate Tax Updates - understanding the impact of the recent income and estate tax legislation on your planning, as well as exploring strategies that may reduce your tax exposure; o Estate Planning Basics - a review of estate planning fundamentals, including a look at conventional estate planning strategies and how the changes in the estate tax laws may impact that conventional planning; o Sophisticated Planning Strategies - there are various planning techniques available to leverage taxable gifts, allowing wealth to be funneled to lower generations on a tax-advantaged basis both during lifetime and at death; o Non-Tax Related Planning - a look at how family dynamics, asset protection and state tax issues may impact the estate plan; and o Charitable Planning - identifying the types of gifts and giving techniques that offer the greatest tax benefit to donors both during lifetime and at death. In addition to comprehensive discussion outlined above, the session will include ample opportunity for QandA.

MSAS24

Hot Topics in MR Safety (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Monday, Nov. 30 3:30PM - 5:00PM Location: S105AB

MR SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Kendra Huber, RT, BS, Castle Rock, CO (*Moderator*) Nothing to Disclose
Steven P. DeColle, Edmonton, AB (*Moderator*) Nothing to Disclose

Sub-Events

MSAS24A Safety of the Gadolinium Chelates

Participants
Val M. Runge, MD, Bern, Switzerland (*Presenter*) Research Grant, Siemens AG

LEARNING OBJECTIVES

1) List the minor adverse reactions that occur with Gd chelate administration, and their incidence. 2) Describe the known interactions of the weaker chelates with laboratory tests. 3) Formulate a strategy for contrast use in renal failure patients, considering the impact of NSF. 4) Describe the phenomenon of dentate hyper intensity, and its link to the weaker chelates. 5) Critique the available agents in terms of overall safety.

ABSTRACT

The gadolinium based MR contrast agents (GBCAs) consist of transition metal Gd ions (Gd3+) bound very tightly by chelating agents to form a stable complex (minimizing dissociation in vivo), mitigating the substantial natural toxicity of the free metal ion. MR contrast media, specifically the gadolinium chelates, are in general very safe and lack the nephrotoxicity associated with IV administration of the iodinated agents. Nausea, hives, and taste disturbance are the most frequent adverse reactions caused by GBCAs. All of the available GBCAs have the same incidence of these minor adverse reactions, which is substantially less than with the iodinated agents. It should be noted, however, that life-threatening anaphylactoid reactions - although extremely rare - can occur after IV injection of any contrast agent.The GBCAs can, however, be differentiated on the basis of chelate stability, with important implications for clinical use. Nephrogenic systemic fibrosis (NSF) is a serious late adverse reaction associated with exposure to GBCAs in patients with renal insufficiency. In this situation, release of free Gd3+ is more likely to occur due to the extended presence of GBCAs within the body. Due to the advent of NSF, administration of three agents (Omniscan, Optimark, and Magnevist) is now contraindicated in several clinical situations (by both the FDA and the EMA), including specifically chronic severe kidney disease.In the last year, administration of multiple doses of Omniscan, in patients with normal renal function, has also been shown to be associated with changes in the globus pallidus and dentate nucleus, raising further questions regarding this agent, the least stable of the GBCAs. Use of only the most stable agents (the macrocyclics) is strongly recommended (Dotarem, Gadovist, and ProHance), with marked preferential use of these agents in developed countries.

MSAS24B Performing MRI Exams on Patients with Implant Devices

Participants
William H. Faulkner JR, BS, RT, Ooltewah, TN (*Presenter*) Speakers Bureau, Bracco Group; Consultant, Bracco Group; Consultant, Medtronic, Inc ; Speaker, General Electric Company; Consultant, Metrasens Ltd; Consultant, Aspect Imaging; Speaker, Siemens AG;

LEARNING OBJECTIVES

1) List and define the 3 approved labels for implants and devices as it relates to MRI. 2) Name common safety issues as it relates to B0, B1 and time-varying gradient magnetic fields. 3) Describe the benefit of using B1+rms vs. SAR as it relates to heating of implants and devices. 4) Describe how static field relates to heating of implants and devices.

ABSTRACT

When performing an MR exam on patients with implants and devices there are many factors to consider as it relates to safety. One must first first positively identify the device and then determine the MR labeling and thus the conditions of use. The static (B0) magnetic field can produce torque and translational forces on ferromagnetic objects. Additionally Lenz forces may be encountered with conductive metals. The time-varying gradient magnetic fields have been shown to adversely affect some types of active devices. Radio frequency (B1) fields can result in significant heating and sever burns. It's important for those who are exposing patients to these powerful magnetic fields understand their effects.

MSCT22

Case-based Review of Thoracic Radiology (An Interactive Session)

Monday, Nov. 30 3:30PM - 5:00PM Location: S100AB

CH VA ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Diana Litmanovich, MD, Haifa, Israel (*Director*) Nothing to Disclose

Sub-Events

MSCT22A Airway Disorders

Participants
Diana Litmanovich, MD, Haifa, Israel (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the current imaging technique for evaluating of airway disorders in adult population, with an emphasis on radiation dose reduction. 2) Learn important clinical aspects and characteristic imaging features (both static and dynamic) of various airways abnormalities . 3) Discuss key imaging findings which allow differentiation among various airway disorders, as well as alternative imaging modalities such as thoracic MRI.

ABSTRACT

MSCT22B Pulmonary Arteries and Aorta

Participants
Charles S. White, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

To review pathology of the pulmonary arteries and aorta, focusing on cross-sectional imaging.

MSCT22C Thoracic Civil and Military Trauma

Participants
John P. Lichtenberger III, MD, Bethesda, MD, (john.lichtenberger@usuhs.edu) (*Presenter*) Author, Reed Elsevier

LEARNING OBJECTIVES

1) Incorporate up-to-date epidemiological understanding of thoracic trauma into clinical practice. 2) Identify key imaging features of thoracic trauma in modern civilian and military settings with an emphasis on those features which alter clinical management. 3) Describe the pathogenesis of blast lung injury, its imaging appearance and prognosis.

ABSTRACT

Thoracic trauma is a key component of clinical practice, and radiological evaluation of trauma patients is integral to their surgical management. The medical understanding of civilian thoracic trauma has historically been informed by experiences in military combat. In turn, the development of modern imaging technology in the civilian sector has revolutionized triage and operative planning of trauma patients in both civilian and military settings. This complex interplay between civilian and military trauma care continues today, particularly with the advent of urban warfare. One example of the applicability of military thoracic trauma to the civilian sector is blast injury, a hallmark of modern combat trauma that has increased significantly in the civilian developed world. Most radiologists will care for thoracic trauma patients in medical treatment facilities equipped with modern imaging and surgical capabilities in a civilian setting and with civilian patterns of injury. However, in addition to conventional trauma radiology, exposure to modern combat-specific trauma cases will continue the educational and mutually beneficial interaction between civilian and military trauma medicine and ultimately benefit patient care.

MSMC24

Cardiac CT Mentored Case Review: Part IV (In Conjunction with the North American Society for Cardiac Imaging) (An Interactive Session)

Monday, Nov. 30 3:30PM - 5:30PM Location: S406A

CA VA CT

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.00

Participants
Pamela K. Woodard, MD, Saint Louis, MO (*Director*) Research Consultant, Bristol-Myers Squibb Company; Research Grant, Astellas Group; Research Grant, F. Hoffmann-La Roche Ltd; Research Grant, Bayer AG; Research agreement, Siemens AG; Research Grant, Actelion Ltd; Research Grant, Guerbet SA; ; ;
David A. Bluemke, MD, PhD, Bethesda, MD (*Moderator*) Research support, Siemens AG
Vincent B. Ho, MD, MBA, Bethesda, MD (*Moderator*) In-kind support, General Electric Company

LEARNING OBJECTIVES

1) To understand the clinical indications for retrospective ECG gated cardiac CT. 2) To illustrate methods to assess myocardial function from cine cardiac CT images. 3) To illustrate methods to assess normal and abnormal valvular function from cine cardiac CT images.

ABSTRACT

The mentored case review provides the opportunity for the attendees to learn the image acquistion, post-processing, and diagnosis for a wide variety of cardiac diseases commonly encountered in CT.

Sub-Events

MSMC24A Coronary Artery Disease and Incidental Noncardiac Findings

Participants
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Research Grant, Toshiba Corporation;

LEARNING OBJECTIVES

1) To review coronary CTA principles, including details related to image acquisition. 2) Demonstrate examples of CAD as depicted by CT. 3) Discuss strategies to assess the hemodynamic significance of individual coronary lesions. 4) Illustrate non-cardiac findings on coronary CTA images.

ABSTRACT

CT Angiography (CTA) is a guideline endorsed strategy to assess symptomatic patients with low to intermediate risk of coronary artery disease in both the non-emergent and emergent settings. Coronary CTA uses ECG gating to freeze cardiac motion and enables assessment of the lumen for stenosis. Coronary CTA has a high negative predictive value, but suffers when a lesion is detected with a moderate stenosis. Emerging CT methods are also exploring the role of CT to assess individual lesions, including ones that have been problematic, for hemodynamic significance. The clinical relevance relates to the fact that only lesions that are hemodynamically significant should undergo intervention, for example with balloon angioplasty and stenting. In addition, each coronary CTA should include images reconstructed "skin to skin" over the entire craniocaudal field of view that encompasses the heart. Thus, incidental lesions can and should be reported for all coronary CTA studies.

MSMC24B Congenital Heart Disease

Participants
Dianna M. Bardo, MD, Seattle, WA (*Presenter*) Speaker, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Author, Thieme Medical Publishers, Inc

LEARNING OBJECTIVES

1) Recognize the most common congenital heart disease (CHD) findings found in adults with unsuspected CHD. 2) Recognize and understand findings of CHD in patients with known CHD and the findings which may trigger surgical intervention. 3) Recognize the CT findings of commonly performed surgical procedures for palliation of CHD. 4) Develop an organized pattern for search and reporting of CHD findings. 5) Understand why CT is chosen as the advanced imaging modality over MR.

ABSTRACT

Adults with congenital heart disease (CHD) now outnumber children with CHD two to one. This phenomenon is due to the success of surgical palliation and medical management of patients with even the most severe forms of CHD. Surgical intervention is often performed at the time of diagnosis and in patients with residual hemodynamic lesions is often required throughout life. Though echocardiography is typically the initial imaging modality of choice, diagnosis and imaging surveillance of complex hemodynamic and anatomic CHD lesions is now most often accomplished with CT and MR. CT and CTA imaging techniques may be used to show detailed anatomic and functional images of the heart, postoperative changes and long term consequences of CHD.An organized, reproducible approach to identify cardiac anatomy of CHD lesions and surgical palliation should be adopted in order to accurately and thoroughly describe findings.

Active Handout:Dianna M. Ehrhart Bardo

http://abstract.rsna.org/uploads/2015/9001152/MSMC24B.pdf

MSMC24C Coronary Atherosclerosis and Bypass Grafts

Participants
Gautham P. Reddy, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify focal areas of stenosis in the coronary arteries on CT. 2) Describe the appearance of bypass graft stenosis on coronary CT. 3) Review the diagnosis of aneurysms in the native coronary arteries and in bypass grafts.

ABSTRACT

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Gautham P. Reddy, MD - 2014 Honored Educator

MSMI24

Molecular Imaging Symposium: Case-based MI

Monday, Nov. 30 3:30PM - 5:00PM Location: S405AB

CA NR VA MI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Vikas Kundra, MD, PhD, Houston, TX (*Moderator*) License agreement, Introgen Therapeutics, Inc
Jeffrey T. Yap, PhD, Salt Lake City, UT (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify molecular imaging. 2) Comprehend the basis of aspects of molecular imaging. 3) Describe molecular imaging performed in a radiology setting.

ABSTRACT

This course will describe molecular imaging, identify the mechanisms of some aspects of molecular imaging, and give examples of molecular imaging in oncology. Cases will include those from current practice. Mechanisms and scientific basis of examples will be discussed. Sample applications will be discussed and illustrated. Translational examples, including those that have good potential for clinical application, will be used to illustrate interesting aspects of molecular imaging in oncology.

Sub-Events

MSMI24A Oncology

Participants
Vikas Kundra, MD, PhD, Houston, TX (*Presenter*) License agreement, Introgen Therapeutics, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

MSMI24B Neurology

Participants
Rathan M. Subramaniam, MD, PhD, Baltimore, MD, (rsubram4@jhmi.edu) (*Presenter*) Travel support, Koninklijke Philips NV

LEARNING OBJECTIVES

View learning objectives under main course title.

MSMI24C Cardiology

Participants
Robert J. Gropler, MD, Saint Louis, MO (*Presenter*) Advisory Board, Bracco Group Advisory Board, GlaxoSmithKline plc Advisory Board, Pfizer Inc Advisory Board, Bayer AG Research Grant, GlaxoSmithKline plc Research Grant, Pfizer Inc Research Grant, Clinical Data, Inc Research Grant, Lantheus Medical Imaging, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

MSMI24D Vascular Inflammation

Participants
Chun Yuan, PhD, Seattle, WA (*Presenter*) Research Grant, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; ;

LEARNING OBJECTIVES

View learning objectives under main course title.

MSMI24E Instrumentation

Participants
Jeffrey T. Yap, PhD, Salt Lake City, UT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RCA25

National Library of Medicine: Online Images and Datasets: Options for Research and Presentations (Hands-on)

Monday, Nov. 30 4:30PM - 6:00PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Holly Ann Burt, MLIS, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify freely available online image databases and data archives including those with online case studies. 2) Use basic searching skills across a variety of databases. 3) Locate copyright options for literature images and radiology datasets .

ABSTRACT

In this hands-on workshop, explore radiographic images and data available online. The National Library of Medicine (NLM) is only one of many agencies which support freely available online image databases and data archives. Topics include searching for journal images, identifying copyright options, and finding case studies or images specifically for patients and families. Use search engines and portals offering a radiology option; discover public data archives and how to search and access datasets; and identify available imaging tools. Learn which databases may be the best starting point for your research.

Handout:Holly Ann Burt

http://abstract.rsna.org/uploads/2015/15004108/2015onlinedatabasesRSNA.pdf

RCB25

Basic DICOM with Horos/Ostrix and dcm4che (Hands-on)

Monday, Nov. 30 4:30PM - 6:00PM Location: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Marc D. Kohli, MD, San Francisco, CA (*Presenter*) Research Grant, Siemens AG
Simon Rascovsky, MD, MSc, Bogota, Colombia (*Presenter*) Officer, eDx Tecnologia en Salud SAS

LEARNING OBJECTIVES

1) Describe basic DICOM object metadata structure. 2) Demonstrate familiarity with Osirix/Horos DICOM viewer functions including image display, and measurements. 3) Use Osirix/Horos to send/receive DICOM objects. 4) Name several common dcm4che toolkit tools, and describe their purpose.

RCC25

Technologies for Creating Educational Content and Teaching Files

Monday, Nov. 30 4:30PM - 6:00PM Location: S501ABC

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

Sub-Events

RCC25A Podcasting and Screencasting for Teaching

Participants
Mahesh M. Thapa, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the utility of podcasts and screencasts. 2) List major software packages available for creating podcasts and screencasts. 3) Understand the steps required to create a podcast or screencast.

RCC25B e-Publishing: Why and How to Do It

Participants
Michael L. Richardson, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Know the pros and cons of publishing electronic books. 2) Know the two main formats for publishing electronic books. 3) Be aware of several strategies for converting one's book to electronic form. 4) Know the pros and cons of several software packages used for electronic book conversion.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Michael L. Richardson, MD - 2013 Honored Educator
Michael L. Richardson, MD - 2015 Honored Educator

RCC25C Lecturing 2.0: Innovative Tools and Techniques to Improve the Way We Teach and Learn

Participants
Harprit S. Bedi, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify techniques to incorporate mobile technology into your teaching program. 2) Appraise your current teaching practices in light of the new pedagogical approaches introduced in the lecture.

SPDL21

RSNA Diagnosis Live™: Chest and Abdomen

Monday, Nov. 30 4:30PM - 6:00PM Location: E451B

CH GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Paul J. Chang, MD, Chicago, IL, (pchang@radiology.bsd.uchicago.edu) (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Medical Advisory Board, lifeIMAGE Inc; Medical Advisory Board, Merge Healthcare Incorporated
Gregory L. Katzman, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Neety Panu, MD, FRCPC, Thunder Bay, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will be introduced to a series of radiology case studies via an interactive team game approach designed to encourage "active" consumption of educational content. 2) The participant will be able to use their mobile wireless device (tablet, phone, laptop) to electronically respond to various imaging case challenges; participants will be able to monitor their individual and team performance in real time. 3) The attendee will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

SPSI21

Special Interest Session: Radiology and Radiation Oncology: A Partnership Made in Heaven

Monday, Nov. 30 4:30PM - 6:00PM Location: E351

IR OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Sarah S. Donaldson, MD, Palo Alto, CA (*Moderator*) Nothing to Disclose
Peter R. Mueller, MD, Boston, MA (*Moderator*) Consultant, Cook Group Incorporated

LEARNING OBJECTIVES

1) To understand the role of interventional radiologists in the care of patients with cancer. 2) To understand the increasing role of imaging in radiation oncology. 3) To learn which aspects of oncology must be taught to interventional radiologists in order to enable them to care for cancer patients appropriately. 4) To understand the overlap between radiation oncology and interventional oncology, and how these disciplines can become stronger by collaborating with each other.

Sub-Events

SPSI21A Interventional Oncology: The Fourth Pillar of Cancer Care

Participants
Andreas Adam, MD, London, United Kingdom, (andy.adam@kcl.ac.uk) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSI21B It Takes More than Technology to Be an Oncologist: What Interventional Radiologists Can Learn from Radiation Oncology

Participants
Lizbeth Kenny, MD, FRANZCR, Herston, Australia (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSI21C Image Targeted Oncology: The Birth of a New Specialty

Participants
Anthony L. Zietman, MD, Boston, MA (*Presenter*) Editor, Reed Elsevier

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSI22

Special Interest Session: Radiology and Pathology Diagnostics: Examples in Practice

Monday, Nov. 30 4:30PM - 6:00PM Location: E352

BQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Mitchell D. Schnall, MD, PhD, Philadelphia, PA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Explain the concepts of integrated radiology and pathology reports. 2) Outline how computers can extract information from pathology and radiology images to improve cancer diagnosis. 3) Develop integrated diagnostic pathways.

Sub-Events

SPSI22A Integrated Diagnostic Pathways

Participants
Mitchell D. Schnall, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Honored Educators

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Mitchell D. Schnall, MD, PhD - 2013 Honored Educator

SPSI22B Combined Radiology/Pathology Phenotype Biomarkers

Participants
Anant Madabhushi, MS, Piscataway, NJ (*Presenter*) Research partner, Siemens AG Research partner, General Electric Company Research partner, F. Hoffmann-La Roche Ltd Founder and President, IbRiS, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSI22C Integrated Pathology and Radiology Reporting Tool

Participants
Patricia Goede, PhD, Salt Lake City, UT, (pgoede@xifin.com) (*Presenter*) Employee, XIFIN, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Clinical collaboration across multidisciplinary teams from radiology, pathology and oncology has a significant role in the diagnostic and treatment planning process. Specialists and sub-specialists rely on the ability to view imaging and findings together for diagnosis, clinical correlation and treatment planning. The following paper proposes a patient centric model and tools for image management, collaboration and a use case for integrated continuity of care (CCD) reporting.

SPSI22D Integrated Radiology and Pathology Reporting

Participants
Dieter R. Enzmann, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSI23

Special Interest Session: Comparative Effectiveness Research: Payment and Policy Impact

Monday, Nov. 30 4:30PM - 6:00PM Location: S505AB

HP

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Moderator*) Nothing to Disclose
Alvin Mushlin, MD, New York, NY, (aim2001@med.cornell.edu) (*Presenter*) Nothing to Disclose
J. Sanford Schwartz, MD, Philadelphia, PA (*Presenter*) Research Consultant, Bayer AG; Research Consultant, Blue Cross and Blue Shield Associations; Research Consultant, Takeda Pharmaceutical Company Limited;
C. Craig Blackmore, MD,MPH, Seattle, WA, (craig.blackmore@vmmc.org) (*Presenter*) Royalties, Springer Science+Business Media Deutschland GmbH

LEARNING OBJECTIVES

1) To enhance the imaging community's understanding of the impact of comparative effective research on payment, policy, and research funding decisions.

ABSTRACT

The Washington State Health Technology Assessment Program determines if specific medical technologies will be covered for individuals enrolled in Washington State Health Plans, representing about 25% of the individuals in the state. The program is designed to determine coverage explicitly based on evidence, rather than on political considerations or lobbying, and the decision of the committee are binding. The program has reviewed a substantial number of radiology technologies to date, with a mixed record of approval and non-approval. The greatest barrier to approval of coverage for radiology interventions is lack of evidence for effectiveness, safety, and cost-effectiveness. Evidence based policy decisions from groups like the Health Technology Assessment Program can potentially improve care quality and lower costs through non-coverage of ineffective interventions. However, use of evidence to drive coverage decisions highlights the limitations of the existing literature both in terms of the topics explored, and the methods deployed, and speaks to the great need for technology assessment and comparative effectiveness research.

SPSI24

Special Interest Session: A New Model of Patient Care: Value over Volume

Monday, Nov. 30 4:30PM - 6:00PM Location: S402AB

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Mary C. Mahoney, MD, Cincinnati, OH (*Moderator*) Nothing to Disclose
Jennifer L. Kemp, MD, Denver, CO, (jkemp@divrad.com) (*Presenter*) Nothing to Disclose
James V. Rawson, MD, Augusta, GA (*Presenter*) Nothing to Disclose
Christine Zars, MS, Saint Charles, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the mission and goals of RSNA's Radiology Cares: The Art of Patient-centered Practice and ACR's Imaging 3.0 campaigns. 2) To assess your radiology practice model and realign it to focus on value over volume. 3) To learn tactics to put the concepts of patient-centeredness and value vs. volume into practice. 4) To understand your patients' perspectives as they navigate through the healthcare continuum, especially as it relates to radiology.

ABSTRACT

In many healthcare facilities and institutions, the culture and actual practice of radiology have marginalized the patient. Today the call to practice patient-centered care is one of the primary drivers of change within the radiology community. The benefits include improved patient care, improved communication between radiologists and their patients and referring physicians, and greater awareness of the essential role that radiologists play in patients' overall healthcare. The RSNA's Radiology Cares and ACR's Imaging 3.0 campaigns were launched to provide tools to move the radiology profession to focus on patient-centeredness and to help transform the way radiology is practiced. This session will offer insights into the radiology patient mindset and describe tools to bring the concept of patient-centeredness into practice.

SPSI25

Special Interest Session: Entrepreneurship in Radiology: From Napkin to IPO

Monday, Nov. 30 4:30PM - 6:00PM Location: E451A

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Steve H. Parker, MD, Englewood, CO (*Presenter*) Stockholder, Kaleo, Inc; Stockholder, Cayenne Medical, Inc; Stockholder, Cianna Medical, Inc; Partner, Salt Creek Medical Device Development; Stockholder, Vertos Medical, Inc; Stockholder, SonoCine, Inc; Board Member, SonoCine, Inc; Stockholder, Avenu Medical, Inc; Chairman, Avenu Medical, Inc;
Thomas R. Mackie, PhD, Madison, WI (*Presenter*) Consultant, Accuray Incorporated; Chairman of the Board, HealthMyne
Richard L. Ehman, MD, Rochester, MN (*Presenter*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc; Research Grant, Resoundant, Inc

LEARNING OBJECTIVES

1) Describe the rationale and historical perspective and ethical basis of medical entrepreneurship, the role of patents, and the effect of the Bayh Dole legislation. 2) Describe the areas of greatest opportunity for innovation in radiological sciences, how to pick the right problems to solve, to translate ideas to prototype, and to prove the clinical value of prototype technology. 3) Describe practical aspects of commercializing medical technology, licensing, start-up companies, finding help, setting realistic goals, and appropriate roles for inventors.

MSRO29

BOOST: Head and Neck-eContouring

Monday, Nov. 30 4:45PM - 6:00PM Location: S104B

HN NR RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Suresh K. Mukherji, MD, Northville, MI (*Presenter*) Nothing to Disclose
Sung Kim, MD, New Brunswick, NJ (*Presenter*) Nothing to Disclose
Clifton D. Fuller, MD, PhD, Houston, TX (*Presenter*) In-kind support, General Electric Company; Research Grant, Elekta AB; ; ;

LEARNING OBJECTIVES

1) Review the pertinent anatomy of the upper aerodigestive tract. 2) Discuss the spread patterns of various head and neck tumors. 3) Illustrate the important of multimodality imaging for tumor contouring.

ABSTRACT

This e-contouring session will be given by a head and neck radiologist and radiation oncologist. This session will review the pertinent anatomy of the upper aerodigestive tract, discuss the spread patterns of various head and neck tumor and Illustrate the importance of multimodality imaging for tumor contouring.

SPDL30

RSNA Diagnosis Live™: 'Tic Tac D'Oh' - Test Your Diagnostic Skills at the Crack of Dawn

Tuesday, Dec. 1 7:15AM - 8:15AM Location: E451B

CA GI HN MK NR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Adam E. Flanders, MD, Penn Valley, PA (*Presenter*) Nothing to Disclose
Christopher G. Roth, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Sandeep P. Deshmukh, MD, Philadelphia, PA, (sandeep.deshmukh@jefferson.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will be introduced to a series of radiology case studies via an interactive team game approach designed to encourage "active" consumption of educational content. 2) The participant will be able to use their mobile wireless device (tablet, phone, laptop) to electronically respond to various imaging case challenges; participants will be able to monitor their individual and team performance in real time. 3) The attendee will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

SPSC30

Controversy Session: Gadolinium Contrast Agents and Adverse Effects: Too Much Attention or Too Little?

Tuesday, Dec. 1 7:15AM - 8:15AM Location: E451A

GU MR SQ

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants
Hero K. Hussain, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose
Emanuel Kanal, MD, Pittsburgh, PA (*Presenter*) Consultant, Boston Scientific Corporation; Consultant, Medtronic, Inc; Consultant, St. Jude Medical, Inc; Consultant, Bayer AG; Investigator, Bracco Group; Royalties, Guerbet SA;
Martin R. Prince, MD, PhD, New York, NY, (map2008@med.cornell.edu) (*Presenter*) Patent agreement, General Electric Company; Patent agreement, Hitachi, Ltd; Patent agreement, Siemens AG; Patent agreement, Toshiba Corporation; Patent agreement, Koninklijke Philips NV; Patent agreement, Nemoto Kyorindo Co, Ltd; Patent agreement, Bayer AG; Patent agreement, Lantheus Medical Imaging, Inc; Patent agreement, Bracco Group; Patent agreement, Medtronic, Inc; Patent agreement, Topspins, Inc; Stockholder, Topspins, Inc
Richard H. Cohan, MD, Ann Arbor, MI, (rcohan@umich.edu) (*Presenter*) Consultant, General Electric Company; ; ;
Matthew S. Davenport, MD, Cincinnati, OH, (matdaven@med.umich.edu) (*Presenter*) Book contract, Wolters Kluwer nv; Book contract, Reed Elsevier;

LEARNING OBJECTIVES

1) To discuss associations of gadolinium based contrast agents (GBCA) and Nephrogenic Systemic Fibrosis (NSF). 2) To review rates and types of acute adverse reactions in patients receiving GBCA, and to place those in perspective with respect to the risk of NSF. 3) To discuss several other potential safety factors about GBCA, and to compare and contrast incidence of new potential safety factors among the various CNS-approved GBCA. 4) To explain the current thinking regarding imaging patients with renal impairment, and to define renal function thresholds that might be useful for operationalizing imaging in this patient population.

ABSTRACT

To review associations of gadolinium based contrast agents (GBCA) and Nephrogenic Systemic Fibrosis (NSF), and discuss current practice patterns that led to almost complete elimination of NSF. Speaker: Martin Prince.To review rates and types of acute adverse reactions in patients receiving GBCA, discuss principles of premedication and treatment, and place the acute adverse reaction rate in perspective with respect to the risk of NSF. Speaker: Richard Cohan. To list and integrate several other potential safety factors about GBCA, other than NSF and acute allergic type, into the clinical decision making process about whether or not to administer GBCA, and to compare and contrast incidence of new potential safety factors among the various CNS-approved GBCA available today. Speaker: Emanuel Kanal. To explain the current thinking regarding imaging patients with renal impairment, to highlight the differences that exist between serum creatinine-based and eGFR-based screening, and to define the ranges of renal function thresholds for which caution might be advised to avoid potential harm that might result from the administration of iodinated and gadolinium-based contrast media. Speaker: Matthew Davenport.

URL

SPSH30

Hot Topic Session: Quantitative MR Biomarkers in the MSK System

Tuesday, Dec. 1 7:15AM - 8:15AM Location: E350

MK BQ MR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants
Martin Torriani, MD, Boston, MA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss how MRI-based cartilage mapping techniques yield biomarkers of cartilage integrity, and discuss the technical requirements and current indications for clinical use of these methods. 2) To describe the emerging capabilities of high-resolution MR imaging to examine bone microarchitecture and its potential in providing biomarkers of bone strength. 3) To discuss potential applications of MR spectroscopy in musculoskeletal neoplasms and fat quantification of musculoskeletal tissues such as marrow and muscle.

ABSTRACT

There is strong incentive to increase the role of quantitative techniques in clinical musculoskeletal imaging, especially applications related to cartilage health, bone structure, tumor and metabolic imaging. This Hot Topic session will discuss clinical applications of biomarkers of cartilage integrity (T1rho, T2, T2* and dGEMRIC), bone structure by high-resolution MRI, and tissue metabolism (MR spectroscopy for tumor imaging, muscle and marrow fat content).

Sub-Events

SPSH30A T2, T2*, T1rho and dGEMRIC as Biomarkers of Cartilage Integrity

Participants
Thomas M. Link, MD, PhD, San Francisco, CA, (thomas.link@ucsf.edu) (*Presenter*) Research funded, General Electric Company; Research funded, InSightec Ltd; Royalties, Springer Science+Business Media Deutschland GmbH; Research Consultant, Pfizer Inc;

LEARNING OBJECTIVES

1) To define how T2, T2*, T1rho and dGEMRIC quantitatively assess cartilage matrix composition. 2) To describe the requirements for applying these quantitative measurements to clinical imaging. 3) To critically assess previous clinical studies and list indications for using quantitative cartilage imaging biomarkers.

SPSH30B Bone Microarchitecture by MRI

Participants
Gregory Chang, MD, New York, NY (*Presenter*) Speaker, Siemens AG

LEARNING OBJECTIVES

1) To define bone microarchitecture and its contribution to bone strength and fracture risk. 2) To describe the technical requirements for MRI of bone microarchitecture, including hardware, pulse sequences, and image post-processing. 3) To provide an overview of clinical studies of MRI of bone microarchitecture.

SPSH30C MR Spectroscopy of the Musculoskeletal System

Participants
Martin Torriani, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To define how MR spectroscopy quantitatively measures tissue biochemistry. 2) To describe general guidelines for usage of MR spectroscopy in musculoskeletal clinical imaging, including technical factors, quantification/analysis and interpretation. 3) To assess the state-of-the-science in regards to the use of MR spectroscopy for musculoskeletal tissues.

MSAS31

The Emperor's Wearing a Speedo! Clinical Challenges with Electronic Health Records (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S105AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Dana Aragon, RT, Albuquerque, NM (*Moderator*) Nothing to Disclose
Patricia Kroken, Albuquerque, NM (*Moderator*) Nothing to Disclose
Rena Zimmerman, MD, Sequim, WA, (rzimmerman@olympicmedical.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Lack of interoperability of systems. 2) Necessity of creating a useful database. 3) Training of personnel and communication with the Information Technology department. 4) Data entry. 5) Copy/Paste - Document bloat - Meaningful Use. 6) Therapeutic relationship with the patient.

ABSTRACT

With the passage of the Patient Protection and Affordable Healthcare Act, electronic health records (EHR) are being widely adopted in all healthcare settings. While there are many possible benefits to widespread adoption of EHRs, there are inherent clinical challenges that must be addressed to improve outcomes. These will be illustrated using examples from my personal experience with different systems as a practicing radiation oncologist and surveyor for the American College of Radiology.

MSCC31

Case-based Review of Nuclear Medicine: PET/CT Workshop-Head and Neck Cancers (In Conjunction with SNMMI) (An Interactive Session)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S406A

HN NR CT NM OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Janis P. O'Malley, MD, Birmingham, AL (*Director*) Nothing to Disclose
Jonathan E. McConathy, MD, PhD, Saint Louis, MO (*Presenter*) Research Consultant, Eli Lilly and Company; Research Consultant, Blue Earth Diagnostics Ltd; Research Consultant, Siemens AG; Research support, GlaxoSmithKline plc

LEARNING OBJECTIVES

1) Participants will use FDG-PET/CT more effectively in their clinical practice through better understanding of the anatomy, clinical scenarios, and differential diagnoses relevant to the diagnostic imaging of head and neck cancers.

MSES31

Essentials of Chest Imaging

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S100AB

CH CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

MSES31A Large Airway Disease

Participants
Phillip M. Boiselle, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Accurately identify normal large airway anatomy, variants, and common forms of pathology on MDCT scans. 2) Employ a pattern-based approach to facilitate accurate diagnosis of congenital and acquired causes of large airways disease on MDCT scans. 3) Recognize the overlap of MDCT airway findings between health and disease states.

ABSTRACT

1. Accurately identify normal large airway anatomy, variants, and common forms of pathology on MDCT scans.2. Employ a pattern-based approach to facilitate accurate diagnosis of congenital and acquired causes of large airways disease on MDCT scans.3. Recognize the overlap of MDCT airway findings between health and disease states.

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Phillip M. Boiselle, MD - 2012 Honored Educator

MSES31B Pleural Disease

Participants
Travis S. Henry, MD, San Francisco, CA (*Presenter*) Spouse, Medical Director, F. Hoffmann-La Roche Ltd

LEARNING OBJECTIVES

1) Identify pleural thickening and differentiate the appearance from normal plera on imaging. 2) Differentiate different causes of unilateral and bilateral pleural effusions to help narrow a differential diagnosis or provide a specific diagnosis. 3) Identify different manifestations of asbestos-related pleura disease. 4) Provide a differential diagnosis for pleural tumors.

ABSTRACT

MSES31C HRCT Reticular Pattern

Participants
Susan J. Copley, MD, FRCR, London, United Kingdom, (sue.copley@imperial.nhs.uk) (*Presenter*) Consultant, Boehringer Ingelheim GmbH; Consultant, InterMune, Inc

LEARNING OBJECTIVES

1) Accurately identify the Reticular pattern on HRCT. 2) List the differential diagnosis for the reticular pattern. 3) Recognize distinguishing features of particular entities that may result in this pattern.

ABSTRACT

1) Accurately identify the Reticular pattern on HRCT.2) List the differential diagnosis for the reticular pattern.3) Recognize distinguishing features of particular entities that may result in this pattern.

MSQI31

Quality Improvement Symposium: The Value of Practice Quality Improvement

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S406B

SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Ella A. Kazerooni, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

MSQI31A ABMS: Why Practice Quality Improvement is an MOC Requirement

Participants
Lois Margaret Nora, MD, JD, MBA, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Explain the role of practice assessment and performance improvement in Board Programs of Maintenance of Certification. 2) Explain new standards of MOC and how boards are increasing relevance and decreaseing burden for practicing physicians doing practice assessment and performance improvement. 3) Assess the role of professional self-regulation in the future of health system change.

ABSTRACT

ABMS Board Certification is a longstanding and important component of the medical profession's professional self-regulation. The ABMS Program for Maintenance of Certification MOC (ABMS MOC®) activities emphasize ongoing professional development and assessment that is aligned with other professional expectations and requirements within health care. The ABMS Program for MOC incorporates the six core competencies defined by ABMS and the Accreditation Council for Graduate Medical Education (ACGME) [(1) practice-based learning and improvement, (2) patient care and procedural skills, (3) systems-based practice, (4) medical knowledge, (5) interpersonal and communication skills and (6) professionalism] within a four-part framework: Professionalism and Professional Standing; Lifelong Learning and Self-Assessment; Assessment of Knowledge, Judgment, and Skills; and, Improvement in Medical Practice. While these elements are consistent across all Member Boards, each board tailors the expectations within each element to meet the particular specialties for which it provides certification. This presentation will explain some of the changes and innovations that ABMS Member Boards are incorporating into their MOC Programs and particularly the element related to Improvement in Medical Practice.

MSQI31B ACR Perspective: How ACR Supports PQI

Participants
Bibb Allen JR, MD, Birmingham, AL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the mandate for higher value care and such as the federal Physician Quality Reporting System and the American Board of Radiology Practice Quality Improvement as it relates to Maintenance of Certification. 2) Describe the process for development of metrics appropriate to radiology. 3) Examine ways their practices can participate in these programs using workflow tools and registry reporting. 4) Examine how registry reporting can provide benchmarks and dashboards for continuing practice improvement.

ABSTRACT

In an article in the New England Journal of Medicine in March 2015, Health and Human Services Secretary Sylvia Burwell set new targets for value-based payments in Medicare. She states their goal is that 85% of Medicare fee-for-service payments will be tied to quality or value by 2016. Most likely this will be administered through the Medicare Physician Quality Reporting System (PQRS); however, has been difficult thus far for many radiology practices to achieve full participation in PQRS. Additionally, the American Board of Radiology requires documentation of Practice Improvement Project (PQI) for participation in Maintenance of Certification (PQI). In an effort to prepare radiologists to be successful in demonstrating higher value care and because we believe radiologists will be more likely to participate if what we measure provides value to ourselves and our patients, the American College of Radiology is working with CMS and the ABR to develop meaningful metrics for radiology to be used for quality reporting. Radiologists are also working to develop tools to capture the information as part of our daily workflow either though PACS, dictation software or EHR. While the information could be used internally for process improvement, if metrics are standardized, we have an opportunity for national registry reporting which offers not only opportunity for internal process improvement but also benchmarking, and since CMS now allows reporting PQRS metrics through a Qualified Clinical Data Registry, by reporting through these registries practices and individuals can qualify for PQRS and by using this reporting as a basis for ABR quality activities, physicians may seamlessly participate in PQI for MOC. Finally, registry reporting allows data mining and supports socioeconomic research in radiology, so we can learn where there are opportunities for further improvement in the car of our patients.

MSQI31C ABR Perspective: New PQI Efforts

Participants
Milton J. Guiberteau, MD, Houston, TX, (guiberteau@theabr.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1.) Explain the implications of the ABMS MOC 2015 Standards for tailoring the American Board of Radiology's (ABR) MOC program requirements to the practice environments and culture of radiological professionals. 2) Articulate the rationale for changes in the

ABR MOC Program to alleviate duplication of effort and overall resource burden in complying with MOC program requirements. 3) Implement changes in diplomates' personal MOC compliance plans to meet the requirements of MOC employing new options. 4) Explain ABR efforts to explore additional improvements to promote diplomate satisfaction and sense of accomplishment in MOC participation in the future.

ABSTRACT

In the 2015 MOC Standards, ABMS has reiterated and expanded its acknowledgment that the fundamental structure of MOC intended for all ABMS Board MOC programs may be best implemented by creating options for compliance which recognize the unique cultures and practice environments of each medical specialty represented by its 24 member Boards. In response, the American Board of Radiology has instituted changes in its MOC program to alleviate duplication of effort in meeting the requirements of its MOC program by recognizing and giving credit for diplomate efforts already expended as part of their ordinary workday, especially those pertinent to Quality Improvement (MOC Part IV). By doing so, the ABR is delivering on its goal of reducing the time and resource burdens of meeting the requirements of MOC while increasing diplomate satisfaction and sense of accomplishment in MOC participation.

MSRO31

BOOST: Breast-Oncology Anatomy (An Interactive Session)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S103AB

BR RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Cristina Fuss, MD, Portland, OR, (fussc@ohsu.edu) (*Presenter*) Nothing to Disclose
Jean L. Wright, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand breast and regional lymph node anatomy. 2) Be familiar with how the basic anatomic images appear on a variety of imaging modalities. 3) Be familiar with breast and regional lymph node contouring techniques used in radiation treatment planning for breast cancer. 4) Apply principles of critical thinking to ideas from experts and peers in the radiologic sciences.

MSRO34

BOOST: CNS-Oncology Anatomy (An Interactive Session)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S103CD

NR RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Christina I. Tsien, MD, Saint Louis, MO (*Presenter*) Speaker Bureau, Merck & Co, Inc
Soonmee Cha, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the imaging characteristics of gliomas. 2) Recognize substantial heterogeneity exists within these tumor types and understand the prognostic and predictive variables to allow for the selection of the appropriate therapy. 3) Explain the role of each modality including surgery, radiotherapy and chemotherapy in managing gliomas.

ABSTRACT

Significant progress has been made in the treatment of CNS tumors with an emphasis on molecular prognostic and predictive biomarkers that allow for appropriate treatment selection. The role of advanced neuro-imaging will help clinicians improve the diagnosis, treatment and response assessment for CNS tumors will be emphasized. This session highlights the need for a multi-disciplinary treatment approach.

RC301

Smoking Related Lung Disease: Radiologic-Pathlogic Correlation

Tuesday, Dec. 1 8:30AM - 10:00AM Location: E451B

CH CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Jeffrey R. Galvin, MD, Baltimore, MD (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the range of lung injury resulting from the inhalation of cigarette smoke. 2) Explain the general mechanisms of cigarette smoke injury. 3) List the currently accepted diagnostic categories. 4) Identify the key imaging features of smoking related lung disease.

ABSTRACT

Symptomatic cigarette smokers are a common source of referral for diagnostic imaging. Radiologists are regularly confronted with an array of findings on plain radiography and computed tomography that mirror varying combinations of emphysema, airway inflammation, airway fibrosis and the changes of pulmonary Langerhans' cell histiocytosis (PLCH). In addition, there is growing acceptance of a link between cigarette smoke and alveolar wall fibrosis. The radiologist is confronted with an extensive list of smoking-related diagnostic categories including: emphysema, obstructive bronchitis, respiratory bronchiolitis-interstitial lung disease (RB-ILD), desquamative interstitial pneumonia (DIP), PLCH and acute eosinophilic pneumonia. These injuries are best understood through correlation of the imaging with pathology and physiology.

Active Handout:Jeffrey R. Galvin

http://abstract.rsna.org/uploads/2015/15001895/RC301.pdf

Sub-Events

RC301A Introduction

Participants
Jeffrey R. Galvin, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1. Describe the range of lung injury resulting from the inhalation of cigarette smoke. 2. Explain the general mechanisms of cigarette smoke injury. 3. List the currently accepted diagnostic categories.

ABSTRACT

Symptomatic cigarette smokers are a common source of referral for diagnostic imaging. Radiologists are regularly confronted with an array of findings on plain radiography and computed tomography that mirror varying combinations of emphysema, airway inflammation, airway fibrosis and the changes of pulmonary Langerhans' cell histiocytosis (PLCH). In addition, there is growing acceptance of a link between cigarette smoke and alveolar wall fibrosis. The radiologist is confronted with an extensive list of smoking-related diagnostic categories including: emphysema, obstructive bronchitis, respiratory bronchiolitis-interstitial lung disease (RB-ILD), desquamative interstitial pneumonia (DIP), PLCH and acute eosinophilic pneumonia. These injuries are best understood through correlation of the imaging with pathology and physiology.

RC301B CT Definable Subtypes of COPD

Participants
Alexander A. Bankier, MD, PhD, Boston, MA (*Presenter*) Author with royalties, Reed Elsevier Consultant, Olympus Corporation

LEARNING OBJECTIVES

1) Describe the current Fleischner classification of chronic obstructive pulmonary disease (COPD). 2) Identify the different categories of emphysema and associated abnormalities on computed tomography. 3) Explain the relationship between image derived assessment of COPD and clinical assessment including pulmonary function.

ABSTRACT

Symptomatic cigarette smokers are a common source of referral for diagnostic imaging. Radiologists are regularly confronted with an array of findings on plain radiography and computed tomography that mirror varying combinations of emphysema, airway inflammation, airway fibrosis and the changes of pulmonary Langerhans' cell histiocytosis (PLCH). In addition, there is growing acceptance of a link between cigarette smoke and alveolar wall fibrosis. The radiologist is confronted with an extensive list of smoking-related diagnostic categories including: emphysema, obstructive bronchitis, respiratory bronchiolitis-interstitial lung disease (RB-ILD), desquamative interstitial pneumonia (DIP), PLCH and acute eosinophilic pneumonia. These injuries are best understood through correlation of the imaging with pathology and physiology.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Alexander A. Bankier, MD, PhD - 2013 Honored Educator
Alexander A. Bankier, MD, PhD - 2014 Honored Educator
Alexander A. Bankier, MD, PhD - 2015 Honored Educator

RC301C Inflammatory Lung Disease in Smokers

Participants
Seth J. Kligerman, MD, Denver, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the categories of cigarette smoke related lung inflammation. 2) Classify the smoking-related inflammatory disorders including: respiratory bronchiolitis, desquamative interstitial pneumonia, pulmonary Langerhans cell histiocytosis and acute eosinophilcpneumonia. 3) Identify the key imaging features of smoking-related inflammatory disease on imaging. 4) Understand how pathologic changes mirror findings on imaging.

ABSTRACT

Smoking Related Lung Disease: Radiologic-Pathologic CorrelationSymptomatic cigarette smokers are a common source of referral for diagnostic imaging. Radiologists are regularly confronted with an array of findings on plain radiography and computed tomography that mirror varying combinations of emphysema, airway inflammation, airway fibrosis and the changes of pulmonary Langerhans' cell histiocytosis (PLCH). In addition, there is growing acceptance of a link between cigarette smoke and alveolar wall fibrosis. The radiologist is confronted with an extensive list of smoking-related diagnostic categories including: emphysema, obstructive bronchitis, respiratory bronchiolitis-interstitial lung disease (RB-ILD), desquamative interstitial pneumonia (DIP), PLCH and acute eosinophilic pneumonia. These injuries are best understood through correlation of the imaging with pathology and physiology.

RC301D Fibrotic Lung Disease in Smokers

Participants
Jeffrey R. Galvin, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the categories of cigarette smoke related lung fibrosis. 2) Identify the key imaging features that indicate the presence of lung fibrosis. 3) Explain the importance of imaging in the interpretation of pulmonary functions.

ABSTRACT

Symptomatic cigarette smokers are a common source of referral for diagnostic imaging. Radiologists are regularly confronted with an array of findings on plain radiography and computed tomography that mirror varying combinations of emphysema, airway inflammation, airway fibrosis and the changes of pulmonary Langerhans' cell histiocytosis (PLCH). In addition, there is growing acceptance of a link between cigarette smoke and alveolar wall fibrosis. The radiologist is confronted with an extensive list of smoking-related diagnostic categories including: emphysema, obstructive bronchitis, respiratory bronchiolitis-interstitial lung disease (RB-ILD), desquamative interstitial pneumonia (DIP), PLCH and acute eosinophilic pneumonia. These injuries are best understood through correlation of the imaging with pathology and physiology.

RC302

Technologies to Enable Residency Program Administration

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S504AB

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Terry S. Desser, MD, Stanford, CA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Educate program directors about software tools and work strategies that can make data collection for the Next Accreditation System more efficient. 2) Illustrate hardware and software technology that is useful in delivery of educational content to residents during conferences and for just-in-time learning. 3) Learn about the tools developed by the RSNA that can be useful to residents and program directors for delivery of educational content and in residency program administration. 4) Discover ways that the popular video portal YouTube can be used to deliver educational content and track learning activities.

ABSTRACT

Radiology residency administration is an increasingly time- and labor-intensive activity for Program Directors and Coordinators. Under the Next Accreditation System, learning activities for each of the 12 Radiology Resident Milestones must be developed, and each resident's progress toward mastery must be tracked and reported semi-annually to the ACGME. Much work has been done in the Radiology community in developing materials that can be used for imparting both clinical and non-clinical skills to residents. This Refresher Course will present technologies and strategies that can be helpful to program directors to disseminate this information and content to resident learners, and to efficiently measure and report their progress to ACGME.

Active Handout:Terry S. Desser

http://abstract.rsna.org/uploads/2015/15002491/RC302.pdf

Sub-Events

RC302A Technologies for Educational Content Delivery

Participants
Harprit S. Bedi, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC302B RSNA Technologies for Resident Education

Participants
William J. Weadock, MD, Ann Arbor, MI (*Presenter*) Owner, Weadock Software, LLC

LEARNING OBJECTIVES

View learning objectives under main course title.

RC302C YouTube: Pros and Cons as an Educational Outlet

Participants
Christopher F. Beaulieu, MD, PhD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the steps involved in creation and posting of a YouTube video. 2) List the benefits of free, worldwide accessible radiology education videos. 3) Explain current limitations of YouTube as pertaining to radiology education.

ABSTRACT

Most radiology conferences are delivered locally to small groups of learners and are not recorded. For the presenter, these efforts involve many hours of preparation, and it can be disappointing that only a subset of trainees attend a given conference. YouTube makes it possible to post large video files at no cost, enabling any time, anywhere viewing. This makes teaching materials continuously accessible to large numbers of viewers. Creation of a video can be quite time efficient if it is recorded simultaneous to the live presentation. Several software programs provide both live web streaming and video/audio capture. For radiology, high quality video recording is critical. Audio quality can be excellent with use of a microphone. Benefits of YouTube include its no-cost hosting, high quality playback, the ability to obtain viewer comments, and quantitative "analytics" related to viewership. Analytics include number of views, location, viewing time, gender, and numerous other metrics. YouTube videos can also be "embedded" in other web sites. One can also elect to "monetize" content to collect a small amount of ad-sharing revenue (~0.2 cents per view) if ads are included. Disadvantages of YouTube include the time required to create and post the content, varying educators' viewpoints in terms of whether they want to record and post, and limited feedback. There are also copyright and branding issues that have yet to be fully understood. Thus far, my experience with YouTube has been very positive. Residents and fellows appreciate the ability to view or review the content on their own time. Trainees can preview a didactic video before conference and use conference time for related cases. Worldwide viewership has resulted in over 50,000 views in the last year, translating into over 5000 virtual lecture hours (live lecture time 11 hours). To view my channel, see: https://www.youtube.com/user/MozchopsMD

RC303

Cardiac Series: Imaging of Coronary Artery Disease

Tuesday, Dec. 1 8:30AM - 12:00PM Location: S405AB

CA CT MR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Arthur E. Stillman, MD, PhD, Atlanta, GA (*Moderator*) Nothing to Disclose
Robert M. Steiner, MD, Philadelphia, PA (*Moderator*) Consultant, Educational Symposia; Consultant, Johnson & Johnson
Suhny Abbara, MD, Dallas, TX (*Moderator*) Author, Reed Elsevier; Editor, Reed Elsevier; Institutional research agreement, Koninklijke Philips NV; Institutional research agreement, Siemens AG

Sub-Events

RC303-01 MRI of Coronary Ischemia (Coronary MRA, Stress Perfusion)

Tuesday, Dec. 1 8:30AM - 9:10AM Location: S405AB

Participants
David A. Bluemke, MD, PhD, Bethesda, MD (*Presenter*) Research support, Siemens AG

LEARNING OBJECTIVES

1) Describe the role of CMR for evaluation of myocardial perfusion. 2) Describe the results of CMR for evaluation of myocardial ischemia. 3) Indicate potential uses and methods for coronary artery evaluation by CMR.

ABSTRACT

Cardiac MRI (CMR) is an established modality for evaluation of ischemic myocardial disease; appropriateness criteria increasingly recognize the role of CMR in this role. CMR has outstanding temporal resolution allowing for accurate representation of myocardial volumes and function. Excellent soft issue contrast for myocardial ischemia evaluation is achieved with the use of a gadolinium contrast agent. Stress perfusion CMR during adenosine infusion compares favorably to nuclear medicine methods but can additionally assess volumes and mass very accurately. Stress CMR is used in combination with late gadolinium enhancement (LGE) techniques to depict viable myocardium to improve the specificity of the method. Coronary artery imaging with CMR is best performed at 1.5 T and is useful to assess for anomalous coronary artery imaging and confirm perfusion results. This session will describe the techniques, indications, results and interpretation of CMR for evaluation of ischemic disease of the myocardium.

Active Handout:David A. Bluemke

http://abstract.rsna.org/uploads/2015/15003318/RC303-01 Bluemke RSNA coronary and stress CMR.pdf

RC303-02 Evaluation of Obstructive Coronary Artery Disease in Patients with Agatston Score More than 500: Comparison of Computed Tomographic Angiography and Magnetic Resonance Angiography

Tuesday, Dec. 1 9:10AM - 9:20AM Location: S405AB

Participants
Makoto Amanuma, MD, Takasaki, Japan (*Presenter*) Nothing to Disclose
Takeshi Kondo, Takasaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Hideyuki Matsutani, Takasaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Takako Sekine, Takasaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomoko Miyata, Saitama, Japan (*Abstract Co-Author*) Employee, Toshiba Corporation
Shigehide Kuhara, MS, Otawara, Japan (*Abstract Co-Author*) Nothing to Disclose
Shinichi Takase, Takasaki, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

One of the limitations of coronary computed tomographic angiography (CCTA) is poor diagnostic accuracy for segments with severe calcification. On the other hand, the effect of calcification is considered limited on coronary magnetic resonance angiography (CMRA). The purpose of this study was to compare clinical feasibility of CCTA and CMRA for evaluation of obstructive coronary artery disease in patients with severe calcification.

METHOD AND MATERIALS

Written informed consent was obtained from all patients. In 29 patients(72±12 years,M:F=21:8)with high grade calcification (Agatston score>500) CCTA and CMRA findings were compared with the ICA findings as a reference standard. A 320-row area detector CT system (Aquilion ONE/ViSION Edition, Toshiba) was used for CCTA and a 1.5T MR unit (Vantage Titan, Toshiba) was used to obtain CMRA. For CCTA prospective one or two-beat scanning targeted at mid diastole was performed with the cardiac phase for scanning set to R-R 75%. For CMRA non-contrast 3D steady-state gradient echo technique with ECG gating and respiratory navigation technique was used. The coronary arteries were divided to 7 proximal segments (#1-#3, #5-#7, #11) based on the AHA classification and evaluated. Luminal stenosis (>50%) was judged both on CCTA and CMRA by consensus of two experienced readers with the ICA findings as a reference standard.

RESULTS

The mean Agatston score of the 29 patients was 1763 (SD: 1092, Range: 502-4674, median: 1348). With non-assessable segments considered to be stenotic, the diagnostic accuracy of CCTA and CMRA was 76.6% and 83.6% on a per-segment basis. When non-assessable segments were considered to be an incorrect diagnosis, the diagnostic accuracy of CCTA and CMRA was 72.1% and

82.6%, showing no statistically significant difference. When evaluation was limited to the segments with severe calcification involving 50% or more of the vessel wall, accurately assessable segment was 49.1% on CCTA and 78.4% on CMRA, showing a statistically significant difference (p=0.0001).

CONCLUSION

CMRA provides a higher diagnostic accuracy than does CCTA in patients with severe calcification.

CLINICAL RELEVANCE/APPLICATION

Coronary MRA provides a high diagnostic accuracy and recommended for evaluation of obstructive coronary arterial disease in patients with severe calcification.

RC303-03 Rosuvastatin Effect on Coronary Atherosclerosis Plaques Evaluated by 64-detector CT in Patients with Stable Coronary Heart Disease and Hyperlipidemia

Tuesday, Dec. 1 9:20AM - 9:30AM Location: S405AB

Participants
Jian-Xing Qiu, MD, Beijing, China (*Presenter*) Nothing to Disclose
Xiaoying Wang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Xiaochao Guo, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the coronary atherosclerosis plaque changes by 64-detector CT on the follow-up examination of the patients, who treated by rosuvastain, with stable coronary heart disease and hyperlipidemia.

METHOD AND MATERIALS

The study included 30 patients, (27 males and 3 females), with stable coronary heart disease (stable angina for more than one month) and hyperlipidemia (LDL-C≥130 mg/dl without treatment, LDL-C≥100 mg/dl with treatment). Every patient underwent 64-detector CT coronary angiography twice before and after 76 weeks treatment with Rosuvastatin 20 mg q.d. The initial CT angiography at least detected one or more soft plaques with lumen stenosis ≥25%. We detected 35 target plaques totally. The volume of target plaques, the maximum sectional area(MASA) of plaques, the mean CT value(MCTV),the stenosis degree caused by the target plaques were measured on the initial and the follow-up CT examinations using the semi-automatic atherosclerosis plaque analysis software. The paired-samples t test was used to analyze the measurements in SPSS 10.0.

RESULTS

After Resuvastatin treatment for 76 weeks, the volume of target plaques decreased significantly from 53.8±38.9 mm^3 to 41.5±27.4 mm^3(p=0.011)after Rosuvastatin treatment, the MASA of target plaques decreased from 7.56±3.86 mm^2 to 6.11±2.81 mm^2 (p=0.038). the MCTV of target plaques had nonsignificant decrease from 66.42±28.62 Hu to 60.99±39.18 Hu (p=0.687), the stenosis degree caused by the target plaques decreased significantly from 55% to 46%.

CONCLUSION

The measurement change of target plaques demonstrated by 64-detector CT coronary angiography for the patients with stable coronary heart disease and hyperlipidemia include a decrease of the plaque volume, the maximum sectional area, and the stenosis degree.

CLINICAL RELEVANCE/APPLICATION

The 64-detector CT coronary angiography could analyze the effect of Statin for coronary atherosclerosis plaque.

RC303-04 Late Gadolinium Enhancement

Tuesday, Dec. 1 9:30AM - 10:10AM Location: S405AB

Participants
Scott D. Flamm, MD, Cleveland, OH, (flamms@ccf.org) (*Presenter*) Medical Director, Precision Image Analysis, Inc; Board of Directors, Precision Image Analysis, Inc;

ABSTRACT

Learning Objectives:1. Understand the distinct advantages of late gadolinium enhancement imaging by cardiac MRI.2. Articulate the mechanisms responsible for the increased signal intensity in irreversibly damaged myocardium. 3. Recognize the clinical situations appropriate for cardiac MRI late gadolinium enhancement imaging. Abstract:CMR has the unique ability to evaluate several markers of myocardial viability that are of proven value. Reliable and accurate assessment of myocardial scar burden, coronary perfusion, and contractile reserve by CMR are all well established.Direct imaging of myocardial fibrosis has been possible for well over a decade using an inversion-recovery prepared T1-weighted sequence following the intravenous administration of a gadolinium-chelate (Gd). This CMR technique has been named "late gadolinium enhancement" (LGE) and demonstrates non-viable tissue as "hyperenhanced" or bright. Both interstitial and replacement fibrosis enhance similarly with LGE for reasons described below. The hyperenhancement of interstitial fibrosis is more commonly seen in infiltrative entities such as hypertrophic cardiomyopathy and amyloidosis, where the issue of viability is less prominent.The excellent spatial resolution and tissue characterization afforded by CMR makes it ideal for both: 1) quantification of significant areas of viable myocardium, and 2) defining discrete regions of non-viability. Accurate quantification of areas of scar and viable tissue is clearly important in predicting mortality as the benefits of revascularization rise steeply when the area of dysfunctional but viable myocardium reaches a critical size. Further, characterization of non-ischemic patterns of LGE allows differentiation of the breadth of non-ischemic cardiomyopathies, and quantification may similarly provide prognostic information.This presentation will review the LGE technique in its various forms, define evaluation of both ischemic and non-ischemic cardiomyopathies, and address where LGE fits within the diagnostic and prognostic pathways in patients with cardiovascular diseases.

RC303-05 Coronary CT Angiography and Perfusion/Scar Imaging

Tuesday, Dec. 1 10:20AM - 11:00AM Location: S405AB

Participants
U. Joseph Schoepf, MD, Charleston, SC, (schoepf@musc.edu) (*Presenter*) Research Grant, Bracco Group; Research Grant, Bayer AG; Research Grant, General Electric Company; Research Grant, Siemens AG; Research support, Bayer AG; ; ;

LEARNING OBJECTIVES

1) Identify suitable CT techniques for the comprehensive assessment of ischemic heart disease. 2) Discuss different CT approaches for evaluating myocardial perfusion. 3) Compare CT to other modalities for determining the hemodynamic significance of coronary artery stenosis.

ABSTRACT

Appropriate non-invasive evaluation of patients with suspected coronary artery disease (CAD) has traditionally rested on the two pillars of morphological assessment for coronary artery stenosis and functional evaluation for determining the downstream hemodynamic significance of lesions. This approach has been informed by the fundamental realization that morphological assessment of coronary artery stenoses rarely reflects the actual level of myocardial ischemia. Further, patient evaluation, prognostication, and management are more reliable and effective when functional and morphological assessments are used in concert.Due to recent advancements in CT technology, coronary CTA (cCTA) has become an integral part of the non-invasive diagnostic work-up for the anatomic evaluation of the coronary arteries of patients with suspected CAD. According to the current appropriate use criteria, cCTA is the method of choice for the exclusion of significant coronary artery stenosis in patients with low and intermediate CAD risk profiles. The diagnostic accuracy of cCTA has been demonstrated by its high sensitivity (96%) and specificity (86%). Furthermore, cCTA can provide global and regional functional evaluation if acquired with an ECG-synchronization technique. In addition to its role in assessing coronary morphology and left ventricular function, cCTA has been utilized in the evaluation of a third aspect in the diagnostic algorithm of ischemic heart disease - myocardial perfusion. As cCTA may provide diagnostic information for each of these three cornerstones of ischemic heart disease management, this emerging technology has the potential to become the stand-alone method for the evaluation of patients with suspected CAD with a single modality, and within a single imaging session.The purpose of this presentation is to review the growing body of evidence on the CT assessment of myocardial perfusion and provide a systematic overview of presently available techniques.

RC303-06 Reduced-Dose Dual-Source Coronary Computed Tomography Angiography (CCTA): Is Raw-Data-Based Iterative Reconstruction Able to Maintain the Diagnostic Confidence?

Tuesday, Dec. 1 11:00AM - 11:10AM Location: S405AB

Participants
Francois Pontana, MD, PhD, Lille, France (*Abstract Co-Author*) Nothing to Disclose
Isabel A. Castellano, PhD, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Tevfik F. Ismail, PhD,MRCP, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Natalie Gartland, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Michael B. Rubens, MBBS, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Edward Nicol, MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose

PURPOSE

To evaluate image quality and diagnostic confidence of a raw-data-based iterative reconstruction technique (SAFIRE) in reduced-dose CCTA images in comparison with standard-dose filtered back projection (FBP) images.

METHOD AND MATERIALS

107 consecutive patients (72 males; 35 females), referred for a CCTA were prospectively included using a dual source CT system in a high pitch (n=51) or a sequential prospective gating scanning mode (n=56) according to the heart rate (mean DLP value = 204.6 mGy.cm). From each acquisition 4 series of images were reconstructed: (a) standard-dose images, reconstructed with FBP considered as the reference standard (Group 1) and (b) 3 series of reduced-dose images, obtained with a prototype software which virtually increased the level of noise simulating a 30% dose reduction, and reconstructed with FBP (Group 2) and SAFIRE with a preset strength of 3 (Group 3) and 5 (Group 4). Two readers blindly evaluated each series for (a) objective noise and CNR ; (b) coronary border sharpness, lesion detection and (c) diagnostic confidence level using a 5-point scale.

RESULTS

In Group 2, there was a significant increase in the mean level of objective noise compared to Group 1 (36.8 ±6.7 vs 30.4 ±5.2; p<0.0001) and an impairment of the CNR (15.6 ±4.3 vs 18.7 ±4.5; p<0.0001), which hampered the detection of 9 plaques. In Group 3 and 4, despite the 30% dose reduction, all the lesions depicted in Group 1 were seen and SAFIRE restored or improved the objective image quality respectively: (a) mean noise= 31.1 ±5.4; p=0.1 and 22.3 ±4.2; p<0.0001, and (b) CNR= 18.5 ±5.0; p=0.9 and 25.8 ±7.0; p<0.0001. However the diagnostic confidence was altered when compared with Group 1 (p<0.0001), mainly rated as moderate with a blurred aspect of the coronary borders (81/107; 75.7% and 103/107; 96.3%)(p<0.0001) and a significant number of artefactual non stenosing soft plaques described in vessels considered as normal in Group 1 (105/222; 47.3% and 194/222; 87.4%)(p<0.0001).

CONCLUSION

Raw-data-based iterative reconstruction allowed significant image noise reduction but may be associated with blurring of the coronary luminal borders, which can decrease diagnostic confidence.

CLINICAL RELEVANCE/APPLICATION

When reporting reduced-dose CCTA with iterative reconstruction, blurred-border and false smooth plaque artifacts must be considered in diagnostic assessment and subsequent patient management.

RC303-07 Prognostic Value of CT Coronary Angiography in Asymptomatic Patients with Suspected Coronary Artery Disease. Meta-Analysis of Observational Studies

Tuesday, Dec. 1 11:10AM - 11:20AM Location: S405AB

Participants

Michele Fusaro, MD, Treviso, Italy (*Presenter*) Nothing to Disclose
Salvatore Cassese, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Massimiliano Fusaro, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Giovanni Balestriero, Treviso, Italy (*Abstract Co-Author*) Nothing to Disclose
Leonardo E. La Torre, MD, TREVISO, Italy (*Abstract Co-Author*) Nothing to Disclose
Giovanni Morana, MD, Tresiso, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the prognostic value of CCTA as a screening tool in asymptomatic patients with suspected coronary artery disease (CAD).

METHOD AND MATERIALS

A meta-analysis of observational coronary computed tomographic angiography (CCTA) imaging studies was conducted, by means of search in electronic scientific databases for studies investigating the use of CCTA in asymptomatic patients with suspected CAD. The endpoints were the incidence of acute coronary syndrome (ACS) requiring hospitalization, revascularization and cardiac death. Exclusion criteria were composite outcomes and duplicated data. Odds ratio (OR) with 95% confidence interval [CI 95%] was used as summary statistic.

RESULTS

A total of 7,931 asymptomatic patients from 6 studies received a CCTA for suspected CAD. The proportion of patients without CAD, with CAD<50% and with CAD>50% was 78%, 14% and 8%, respectively.After a median follow-up of 27.1 months [22.0-31.2], Patients without CAD did not show any of the endpoints. Compared to patients with CAD>50%, patients with CAD<50% showed a similar risk of ACS (0.16 [0.02-1.50]; P=0.11) but a lower risk of revascularization (0.04 [0.02-0.10]; P<0.001) and death (0.05 [0.01-0.44]; P=0.007).

CONCLUSION

Two-third of asymptomatic patients receiving CCTA for suspected CAD had no evidence of disease and no events at follow-up. The presence of CAD>50% significantly increases the risk of revascularization and death as compared to CAD<50%, although the percentage is quite low. Nevertheless, patients with CAD>50% have a risk of ACS comparable to those with CAD<50%.

CLINICAL RELEVANCE/APPLICATION

In asimptomatic patients there is not evidence of the utility of CCTA as a screening tool.

RC303-08 The Role of Imaging for Management of Coronary Artery Disease - State of the Evidence

Tuesday, Dec. 1 11:20AM - 12:00PM Location: S405AB

Participants
Leslee Shaw, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose

RC304

Musculoskeletal Series: Ultrasound

Tuesday, Dec. 1 8:30AM - 12:00PM Location: E450A

MK US

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

Participants
Marnix T. van Holsbeeck, MD, Detroit, MI, (marnix@rad.hfh.edu) (*Moderator*) Consultant, General Electric Company Consultant, Koninklijke Philips NV Stockholder, Koninklijke Philips NV Stockholder, General Electric Company Grant, Siemens AG Grant, General Electric Company
Jon A. Jacobson, MD, Ann Arbor, MI, (jjacobsn@umich.edu) (*Moderator*) Consultant, BioClinica, Inc; Royalties, Reed Elsevier; ; ;

LEARNING OBJECTIVES

1) The 'Ultrasound' Series Course will review musculoskeletal sonography through live instruction by expert refresher course instructors, interspersed with scientific presentations.

Sub-Events

RC304-01 Elbow Ultrasound (Demonstration)

Tuesday, Dec. 1 8:30AM - 9:00AM Location: E450A

Participants
Jon A. Jacobson, MD, Ann Arbor, MI (*Presenter*) Consultant, BioClinica, Inc; Royalties, Reed Elsevier; ; ;

LEARNING OBJECTIVES

View learning objectives under main course title.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Jon A. Jacobson, MD - 2012 Honored Educator

RC304-02 Ultrasound of the Distal Biceps Brachii Tendon Using Four Approaches: Reproducibility and Reader Preference

Tuesday, Dec. 1 9:00AM - 9:10AM Location: E450A

Participants
Shefali P. Kothary, MD, New York, NY (*Presenter*) Nothing to Disclose
Theodore T. Miller, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Gabrielle P. Konin, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Ogonna K. Nwawka, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Yoshimi Endo, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Gregory R. Saboeiro, MD, New York, NY (*Abstract Co-Author*) Research funded, Terumo Corporation Speakers Bureau, Bioventus LLC

PURPOSE

To determine which sonographic appearance of the distal biceps tendon is preferred by readers and if images obtained by two different operators are reproducible.

METHOD AND MATERIALS

An IRB approved, HIPAA compliant prospective study was performed evaluating the distal biceps brachii tendon in 40 elbows in 20 volunteers. The subjects had no history of biceps injury or abnormality, and were without antecubital pain. There were 8 males and 12 females, ages 24 to 67 years (mean age of 37) with a body mass index (BMI) of 18.3 to 31.1 (mean BMI of 24.7). Distal biceps brachii tendons of each subject were scanned in long axis using a 6-15 MHz linear transducer on a GE Logic 9 by two experienced musculoskeletal radiologists independently (operator A and B) using four different approaches: anterior, lateral, medial, and posterior. Five musculoskeletal radiologists independently reviewed the static images, and ranked the 4 approaches based on overall combination of echogenicity of the tendon, visualized length, and visualization of the insertion.

RESULTS

The appearance of the distal tendon obtained via the medial approach was preferred by readers in 78.5% (314/400) of cases (74.5% performed by operator A and 82.5% performed by operator B). The anterior approach was preferred by readers in 19.25% (77/400) of cases (24.0% by operator A and 14.5% by operator B). The lateral approach was preferred in 2.25% (9/400) of cases (1.5% by operator A and 3% by operator B), and the posterior approach was never preferred.

CONCLUSION

The appearance of the distal biceps brachii tendon using the medial approach is preferred by readers and is reproducible between different operators.

CLINICAL RELEVANCE/APPLICATION

When sonographically evaluating the elbow for suspected pathology of the distal biceps tendon, the medial approach should be the primary method of visualization, supplemented by the other approaches if necessary.

RC304-03 Shear Wave Elastography (SWE) Improves Treatment Monitoring of Patients with Tendinopathies

Tuesday, Dec. 1 9:10AM - 9:20AM Location: E450A

Participants
Timm Dirrichs, Aachen, Germany (*Presenter*) Nothing to Disclose
Christiane K. Kuhl, MD, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Valentin Quack, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Simone Schrading, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

It has been shown that SWE is useful for the evaluation of tendoninopathies. Purpose of this prospective clinical study was to analyze the correlation between clinical symptoms and tendon stiffness in patients undergoing treatment of tendinopathies. Aim is to establish SWE as tool for monitoring tendon healing under therapy.

METHOD AND MATERIALS

Prospective study in 35 patients with 47 symptomatic tendons (17 achilles, 15 patellar tendons and 15 humeral epicondylitis) who underwent a standardized multi-modality US protocol consisting of B-mode US, power Doppler (PD-US), and SWE, using a high-resolution linear 15 MHz probe (Aixplorer, Supersonic). All patients underwent this multi-modality US protocol three times: prior to any therapy, after 4 week of therapy and after 6 months of therapy. At each visit, patients were seen by an orthopedic surgeon who ranked the patients' clinical symptoms by standardized orthopedic scores (VISA-A, VISA-P, DASH). Clinical scores of symptom severity were correlated with ultrasound findings by using the Spearman correlation.

RESULTS

Clinical scores revealed symptom relief in 46.8% (22/47) of patients after 4 weeks and in 68.0% (32/47) after 6 months. A change of structural tendon abnormalities as observable by B-mode US was detectable in one single patient after 4 weeks (1/22; 4.5%,) as well as after 6 months (1/32; 3.1%). A decrease in neovascularization as observed by PD-US was detectable in 9 patients after 4 weeks (9/22; 40.9%) and in 13 patients after 6 months (13/32; 39.4%). An increase in tendon stiffness as determined by SWE was found in 18 patients after 4 weeks (18/22; 81.8%) and in 28 patients after 6 months (28/32; 90.6%). At quantitative analysis, the 32 patients whose clinical symptoms improved exhibited an increase of mean SWE values by 23 kPa (from 41.7 to 64.2 kPa) after 4 weeks and by 64 kPa (from 41.7 to 105.5 kPa) after 6 months. Clinical scores correlated poorely with findings at B-mode ($r = 0.24$), moderately with findings at PD-US ($r = 0.59$), and perfectly with findings made at SWE($r = 0.80$.)

CONCLUSION

Shear wave elastography correlates better with clinical symptoms and seems to display tendon healing better and earlier than B-mode and Power Doppler.

CLINICAL RELEVANCE/APPLICATION

Shear wave elastography appears to be useful to guide treatment and to develop new treatment approaches in patients with tendinopathies.

RC304-04 Delayed Onset Muscle Soreness (DOMS) after Eccentric Resistance Training of the Elbow Flexor Muscles: Temporal Evolution of MRI, Diffusion Tensor Imaging and Ultrasound Shear-Wave Elastography Findings

Tuesday, Dec. 1 9:20AM - 9:30AM Location: E450A

Participants
Christoph A. Agten, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Florian M. Buck, MD, Langnau am Albis, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Linda Dyer, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Christian W. Pfirrmann, MD, MBA, Forch, Switzerland (*Abstract Co-Author*) Advisory Board, Siemens AG; Consultant, Medtronic, Inc
Andrea Rosskopf, MD, Zurich, Switzerland (*Presenter*) Nothing to Disclose

PURPOSE

To evaluate the appearance of DOMS over time using fluid-sensitive and diffusion-weighted MRI sequences, diffusion-tensor imaging(DTI) and ultrasound(US) shear-wave elastography in healthy volunteers.

METHOD AND MATERIALS

Five men (m;mean age 39.6±4.6 years) and 5 women (w;30.6±13.5 years) underwent unilateral eccentric resistance training of the elbow flexor muscles consisting of 3 sets (12 repetitions each) of individually adapted maximal weights. 1.5T-MRI was done before and after (15 min;1,3, and 7 days) the training, including fluid-sensitive sequences, diffusion-weighted-sequences, and DTI of the distal upper arm. Evaluated MRI parameters were: visible muscle edema (vME; mild, moderate, severe), cross-sectional muscle area (CSMA), muscle diffusion restriction (ADC:10-6mm^2/sec), fractional anisotropy(FA). US shear-wave elastography of the brachial muscle was performed before and after(15min; 0.5,1,2,3 and 7 days) the training. Subjective DOMS-evaluation parameters were assessed:pain (scale 0-10), tension feeling, extension deficit.

RESULTS

In men mean vME was moderate and peaked 3 days post training, for women mean vME was mild and peaked 2 days post training. CSMA was highest 3 days post-training in men(+9%) and women(+11%). Maximum mean ADC value was found after 3 days in men(1809; before training:1530) and women(1742; before:1476). Mean FA dropped from 361(m) and 389(w) to a minimum of 252 and 321 respectively after 3 days.US-elastography revealed an increase of mean shear wave velocity values(MSWV) after training in men(before training:3.0 m/s±0.3; peak 15min post:4.0 m/s±0.9) and in women(before:2.8± 0.4;peak 1 day post:3.2 m/s±0.4). In men a significant positive correlation was found between ADC of M. brachialis and MSWV($r=0.92, p=0.028$) and a significant negative correlation between maximal FA of flexor muscles and pain ($r=-0.99; p<0.001$) was seen. Maximal pain level(m:3±1,w:4±3)

and maximal extension deficit was achieved after 2 days. Tension feeling started 15min post-training and normalized after 7 days.

CONCLUSION

Muscles changes can be detected 15 minutes after eccentric resistance training using diffusion-MRI and US shear-wave elastography. FA correlates negatively with subjective pain symptoms in men. ADC shows changes earlier than fluid-sensitive-MR sequences.

CLINICAL RELEVANCE/APPLICATION

ADC and US-elastography are recommended when looking for very early muscle changes after eccentric muscle exercise.

RC304-05 Ultrasound of the Post-arthroplastic Hip

Tuesday, Dec. 1 9:30AM - 9:40AM Location: E450A

Participants
David Robinson, BSC, Hampton East, Australia (*Presenter*) Nothing to Disclose
Steven Lee, FRANZCR, Windsor, Australia (*Abstract Co-Author*) Nothing to Disclose
Paul Marks, FRANZCR, Box Hill, Australia (*Abstract Co-Author*) Nothing to Disclose
Michal Schneider, PhD, Clayton, Australia (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Ultrasound has been recommended as an imaging modality in the follow-up of hip replacement surgery. However, no descriptions of typical ultrasound appearances of the major pathologies that may afflict the hip replacement have been published to date. We set out to characterize ultrasound findings of the post-arthroplastic hip.

METHOD AND MATERIALS

Patients presenting to the department for routine follow-up imaging of their hip prosthesis were consecutively recruited. Ultrasound imaging was performed of the anterior and posterior prosthesis and of the iliopsoas bursa and tendon.

RESULTS

Fifty two patients were prospectively recruited with a mean (±SD) age of 60.4 (±12) years. Twelve patients had bilateral hip prostheses, giving 64 hips for analysis. There were 45 Birmingham hip resurfacings (BHR), ten MITCH, five Articular Surface Replacement (ASR), three Total Hip Replacements (THR) and one ADEPT hip resurfacing. Mean age of the prosthesis in situ was 8.2 years. Ultrasound was able to reliably image the soft tissues of all hips. The average (±SD) maximal antero-posterior (AP) synovial thickness was 6.5 (± 7) millimeters and the AP Iliopsoas tendon measurement was 4.8 (± 0.94) millimeters. Forty four hips presented with normal ultrasonic appearances. There were 15 iliopsoas bursal effusions ranging from mild (a trace of fluid surrounding the ilipsoas tendon), to very large (fluid-filled masses anterosuperior to the prosthesis). Four hips showed enlargement of the prosthesis-to-bone "step" possibly indicating the process of osteolytic femoral neck thinning. One hip demonstrated mild synovial thickening at the anterior recess.

CONCLUSION

Ultrasound is able to detect and evaluate a range of soft tissue pathologies about the post-prosthetic hip, such as fluid or effusion of the iliopsoas bursa, iliopsoas tendon thickening and heterogeneity, synovial thickening of the anterior and posterior hip joint recesses. Ultrasound imaging has an important role to play in the follow-up of the post-prosthetic hip

CLINICAL RELEVANCE/APPLICATION

Ultrasound of the post-prosthetic hip can demonstrate abnormalities during follow up and may serve as a useful tool in the management of patients with hip replacements.

RC304-06 Hip Ultrasound (Demonstration)

Tuesday, Dec. 1 9:40AM - 10:10AM Location: E450A

Participants
Marnix T. van Holsbeeck, MD, Detroit, MI, (marnix@rad.hfh.edu) (*Presenter*) Consultant, General Electric Company Consultant, Koninklijke Philips NV Stockholder, Koninklijke Philips NV Stockholder, General Electric Company Grant, Siemens AG Grant, General Electric Company
Kathy Quenneville, BS, RT, Commerce Township, MI, (kathyq@rad.hfh.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Demonstrate the osseous landmarks that guide the diagnostic work up of an adult hip. 2) Practice a step by step approach in the evaluation of anterior hip pain. 3) Rationalize the individual steps for the hip dynamic examination.

RC304-07 Ankle and Foot Ultrasound (Demonstration)

Tuesday, Dec. 1 10:20AM - 10:50AM Location: E450A

Participants
Andrew J. Grainger, MRCP, FRCR, Leeds, United Kingdom (*Presenter*) Speaker, General Electric Company; Equipment support, Siemens AG;

LEARNING OBJECTIVES

View learning objectives under main course title.

RC304-08 Semi-Quantitative Sonoelastography of Inflammatory Myopathies: Comparison with Clinical Examination, Magnetic Resonance (MR) Imaging, and Pathologic Finding

Tuesday, Dec. 1 10:50AM - 11:00AM Location: E450A

Participants
Yoonah Song, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Seunghun Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Dae Hyun Yoo, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sung Guk Kim, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate real-time sonoelastography (SEL) in patients with inflammatory myopathies compared to clinical examination, MR imaging, and pathologic finding.

METHOD AND MATERIALS

The study was approved by the institutional review board, and informed consent was waived. Seventeen lesions of 16 consecutive patients with inflammatory myopathies (5 men, 11 women; mean age, 41 years; range, 11-67 years) were assessed with real-time SEL using Hitachi EUB-7500 ultrasound (US) system and software for elastography. Elastogram was obtained using freehand manipulation, compressing areas which were correlated with active inflammation on MR imaging. Using dedicated software for color information from the elastographic images, the relative strains for target muscle and reference muscle were measured. All lesions were underwent an US-guided percutaneous biopsy. The US and MR images were analyzed in conjunction with clinical symptom and biochemical data.

RESULTS

The strain ratio of target muscle was higher than adjacent muscle (mean 3.14; range, 0.95-5.93). There was no significant agreement between the strain ratios of the color parameters and the biochemical data. Sixteen of 17 specimens (94.1%) were confirmed by inflammatory myopathies. One lesion (5.9%) shows well preserved muscle fiber with few lymphocytes infiltration.

CONCLUSION

Muscle hardness as semi-quantitative measured by SEL, was increased in cases of inflammatory myopathies. The correlation between strain ratio from the elastographic images and the pathologic data suggest that SEL could be an important tool not only in the diagnosis but also in the management of the patients with inflammatory myopathies.

CLINICAL RELEVANCE/APPLICATION

High strain ratio could add knowledge regarding early development of inflammatory myopathy, which might have an impact on guidance before US-guided procedure to improve success rate for biopsy.

RC304-09 Real-time Sonoelastography Evaluation of the Achilles Tendon Following Ultrasound-guided Platelet-rich Plasma Injection for Refractory Achilles Tendinopathy

Tuesday, Dec. 1 11:00AM - 11:10AM Location: E450A

Participants
Chin Chin Ooi, MMedSc,BSC, Singapore, Singapore (*Presenter*) Nothing to Disclose
Michal Schneider, PhD, Clayton, Australia (*Abstract Co-Author*) Nothing to Disclose
Peter Malliaras, Melbourne, Australia (*Abstract Co-Author*) Nothing to Disclose
David Connell, Melbourne, Australia (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the clinical feasibility of sonoelastography (SE) in depicting changes in Achilles tendon stiffness following platelet-rich plasma (PRP) injection for Achilles tendinopathy, and to correlate SE findings with clinical outcome at 12 months post-injection.

METHOD AND MATERIALS

Between January 2013 and January 2014, consecutive patients with unilateral refractory Achilles tendinopathy were enrolled. B-mode ultrasound (US), color Doppler (CD) and SE were performed at baseline, 4-6 weeks, 6 months and 12 months post treatment. The strain ratio (strain value between Achilles tendon and Kager's fat) during SE, and the proportion of tendons with intratendinous hypoehogenicities and neovascularities were documented. Clinical outcomes were assessed by the Victorian Institute of Sport Assessment-Achilles (VISA-A) questionnaire at all time points and correlated with the sonographic findings.

RESULTS

Forty-five Achilles tendons from 45 patients (33 males, 12 females, mean age 51, mean symptom duration 15.3 months) were examined. The clinical VISA-A improved significantly from 38.4 (±14.1) at baseline, 77.2 (±12.5) at 6 months ($p < 0.001$) to 81.2 (±10.8) at 12 months ($p < 0.001$). The mean strain ratio values were 2.16 (±1.42) at baseline, 2.03 (±0.67) at 4-6 weeks, 1.81 (±0.62) at 6 months and 1.19 (±0.34) at 12 months with a significant reduction observed at 6 months ($p = 0.006$) and 12 months ($p < 0.001$). The proportion of tendons with neovascularities were significantly reduced at 6 months ($p < 0.001$) and 12 months ($p < 0.001$) whereas a significant change in the distribution of tendons with hypoechogenicities was only observed at 12 months in comparison to baseline ($p < 0.001$). At 12 months evaluation, none of the tendons regained a normal echotexture despite improvement in VISA-A. Strain ratio demonstrated a significant moderate correlation with VISA-A ($r = -0.610$, $p < 0.001$) while B-mode and CD US did not show a significant correlation ($r = -0.041$, $p = 0.817$, and $r = -0.116$, $p = 0.514$).

CONCLUSION

The treated Achilles tendons showed progressive stiffening, along with improvement in clinical findings up to one year follow-up. SE using strain ratio could be a promising supplementary tool for monitoring the progress of Achilles tendon healing after treatment.

CLINICAL RELEVANCE/APPLICATION

The supplementation of SE to conventional US may improve the specificity in routine monitoring of Achilles tendon healing and provide more objective data for safer return to activities.

RC304-10 Comparison of Ultrasound Guided Collagenase Clostridium Histolyticum Injections and Blinded Injections for the Treatment of Dupuytren's Contracture

Tuesday, Dec. 1 11:10AM - 11:20AM Location: E450A

Participants
Eva Llopis, MD, Valencia, Spain (*Presenter*) Nothing to Disclose
Luis Aguilella, MD, Alzira, Spain (*Abstract Co-Author*) Nothing to Disclose
Rosana Perez, MD, Alzira, Spain (*Abstract Co-Author*) Nothing to Disclose
Victoria Higueras, MD, Alzira, Spain (*Abstract Co-Author*) Nothing to Disclose
Elena Belloch, Alzira, Spain (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Collagenase clostridium histolyticum (collagenasa) injections have been proven an effective, safe treatment for Dupuytren disease, an alternative to fasciectomy. Our objective was to analyze the additional value of US guided injections and to study the correlation of US and MR for the diagnosis of Dupuytren disease

RESULTS

All patients were male but 2; average age 66,5yo; 5th finger was the most frequently affected, (group A 50% and B 60.41%) pretendinous cord was the most frequent 71% and52% (group A/B) followed by lateral cord 13% and 28.6% (group A/B). US appearance is variable (combined 45%, hyperechogenic36%, hypoechogenic18%), mean distance from skin1,8mm, average size of the cord 3,9mm (1,6-5,5mm). On T1Wi MR is mainly low SI (36%) or combined 45%. Complete extension (<5% contraction) was achieved in 36.97% and 57,14% (group A/B), the percentage of correction was 70% and 76 (group A /B), p=0.095, being statistically significant for PIP, 54%/76% (group A/B), p=0.020. VAS in 68% and 76% (group A/B), failure in 32% and 23% (group A/B).No nerve damage or tendon rupture occurred. Skin complications 32% and 23,8% (group A/B).

CONCLUSION

US guidance offers better results and slightly decrease of skin complications than blind collagenase injection being a good alternative to fasciectomy, although not statiscally significant. More significant results are seen on lateral cords on PIP contractions, where US is recommended. MR and US can identify collagenous and cellular components, thus potentially improving effectiveness, however US is more variable.

CLINICAL RELEVANCE/APPLICATION

US has added value in targeting Dupuytren cords for injection of collagenase with better outcome and lower rate of complications especially for lateral cords on PIP contractions

RC304-11 Ultrasound-Guided Treatment of Refractory Chronic Plantar Fasciopathy: A Randomized Controlled Pilot Study of Platelet-Rich Plasma versus Corticosteroid Injection

Tuesday, Dec. 1 11:20AM - 11:30AM Location: E450A

Participants
Kenneth S. Lee, MD, Madison, WI (*Presenter*) Research Consultant, SuperSonic Imagine; Consultant, Echometrix, LLC; Royalties, Reed Elsevier
John J. Wilson, MD, MS, Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Sarah Kohn, Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Elizabeth Plovanich, Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Jeffrey Swick, MD, Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Ray Vanderby, PhD, Madison, WI (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate if ultrasound(US)-guided platelet-rich plasma(PRP) injection is effective for treating moderate to severe refractory chronic plantar fasciopathy(PF) compared to standard of care corticosteroid(SOC) injection.

METHOD AND MATERIALS

Inclusion criteria were met,which required unilateral PF,failed conservative therapy,and VAS pain level of at least 5 of 10 for at least 6 months duration. 44 consecutive subjects were randomized into two groups, PRP and SOC.Subjects received either a single injection of autologous PRP or a single injection of triamcinolone 40 mg at week 0. VAS pain levels,validated clinical surveys(FAAM/SANE),and US changes of PF thickness,hypoechogenicity(grade 0 -3),and hyperemia(grade 0-3) were obtained at week 0(pre-injection),week 16 and 32. Analysis of covariance was used for statistical analysis. Statistical significance was determined at p-value<0.05.

RESULTS

21 PRP subjects (mean age 47.8 yrs; range 30-64), M:F(4:17) and 23 SOC subjects (mean age 49.2 yrs; range 30-64), M:F(7:16) completed the 32-week study from March 2011-July 2014. No loss to follow-up.Baseline VAS pain levels were not significant(6.93 in PRP vs 6.63 in SOC;p=0.4). At week 16 and 32,both groups showed improvement in VAS pain levels compared to baseline,but PRP showed greater improvement than SOC over time(6.93 to 2.64 to 1.7;p=0.00).SOC pain level improved initially at week 16 but rebounded by week 32(3.28 to 4.77; p=0.002).FAAM scores improved for both groups(p<0.001)but the PRP group improved by 12.6 more points by week 32(p=0.02).SANE scores showed improving trend over time consistently favoring PRP(p=0.006).132 US exams performed.Baseline US changes were not significant except for hypoechogenicity(2.80 in PRP vs 1.79 in SOC;p<0.002).PF thickness decreased(mean of 0.33 mm;p<0.001) in both groups but no difference between groups(p=0.74).PRP showed greater echotexture improvement than SOC over time(decrease of 0.42/visit, SD 0.13 in PRP vs 0.004/visit in SOC;p=0.003).Hyperemia did not change over time (0.86 for PRP vs 0.81 for SOC,p = 0.80).There were no complications.

CONCLUSION

US-guided PRP injection may be an effective treatment option for refractory chronic PF compared to corticosteroid injection. Larger multi-armed studies are now needed to establish a new standard of care treatment algorithm.

CLINICAL RELEVANCE/APPLICATION

PRP is more effective than corticosteroid injection for the long-term treatment of refractory chronic plantar fasciopathy

PRP is more effective than corticosteroid injection for the long-term treatment of refractory chronic plantar fasciopathy.

RC304-12 Ultrasound-guided Interventions

Tuesday, Dec. 1 11:30AM - 12:00PM Location: E450A

Participants
Kenneth S. Lee, MD, Madison, WI (*Presenter*) Research Consultant, SuperSonic Imagine; Consultant, Echometrix, LLC; Royalties, Reed Elsevier

LEARNING OBJECTIVES

View learning objectives under main course title.

RC305

Neuroradiology Series: Stroke

Tuesday, Dec. 1 8:30AM - 12:00PM Location: N230

NR CT MR ER

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.50

FDA Discussions may include off-label uses.

Participants
Howard A. Rowley, MD, Madison, WI, (hrowley@uwhealth.org) (*Moderator*) Research Consultant, Bracco Group; Research Consultant, Guerbet SA; Research Consultant, General Electric Company; Consultant, F. Hoffmann-La Roche Ltd; Consultant, W.L. Gore & Associates, Inc; Consultant, Lundbeck Group; ; ; ; ; ;
Albert J. Yoo, MD, Newton, MA (*Moderator*) Research Grant, Penumbra, Inc; Research Grant, Terumo Corporation; Research Consultant, Medtronic, Inc;

Sub-Events

RC305-01 Imaging for Stroke Triage: Where Do We Stand?

Tuesday, Dec. 1 8:30AM - 8:55AM Location: N230

Participants
Max Wintermark, MD, Lausanne, Switzerland, (max.wintermark@gmail.com) (*Presenter*) Advisory Board, General Electric Company;

LEARNING OBJECTIVES

1) We will review the most common neuroimaging modalities and treatment algorithms used in the evaluation of acute stroke patients.

ABSTRACT

Neuroimaging has become essential in the evaluation of the acute stroke patient. CT and MRI are used to confirm the diagnosis of acute stroke, exclude stroke mimics, and triage patients for intravenous t-PA and endovascular revascularization therapies. Advanced neuroimaging techniques, including CT-angiography, MR-angiography, CT-perfusion and MR-perfusion further inform acute stroke treatment decisions and are increasingly used in the acute setting. We will review the most common neuroimaging modalities and treatment algorithms used in the evaluation of acute stroke patients.

RC305-02 Feasibility Of Improving Detection Of Early Ischemic Infarction on Head CT Using Continuity-Based Correlative Enhancement.

Tuesday, Dec. 1 8:55AM - 9:05AM Location: N230

Participants
Aseem Sharma, MBBS, Saint Louis, MO (*Presenter*) Stockholder, General Electric Company; Consultant, BioMedical Systems; Co-Founder, Correlative Enhancement, LLC
Manu S. Goyal, MD, MSc, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Michelle M. Miller-Thomas, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Rashmi Jain, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
James D. McEachern, MD, Saskatoon, SK (*Abstract Co-Author*) Nothing to Disclose
Charles F. Hildebolt, DDS, PhD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Recognition of early signs of brain infarction may influence patient management, but can be difficult on head CT. Using custom software (patent pending) that manipulates images based on correlation between intensities of continuous pixels, we aimed to assess the feasibility of improving the detection of brain infarction with head CT images.

METHOD AND MATERIALS

35 head CT images through the region of proven infarction and 20 control images across brain tissue without infarction were post-processed using a custom software (patent pending). Three readers, evaluated the baseline and enhanced images in a masked manner, and marked the location of infarction whenever suspected, while using a 5-point scale to rate their confidence for the presence of infarction. In a separate session, readers rated the comparative ease-of-recognition of signs of infarction for baseline and enhanced images on a 7-point scale, while evaluating these images simultaneously along with the follow-up imaging indicating the infarct distribution. Infarct identification data were analyzed with jackknife, alternative, free-response receiver operating characteristic (JAFROC) weighted software. Comparative ease-of-recognition was assessed using the one-sided Wilcoxon signed rank test for differences > a value of 4.

RESULTS

For infarct localization, JAFROC analysis revealed figure-of-merit values of 0.56 and 0.67 for baseline and enhance images respectively (p=0.03). Corresponding values for infarct localization within 6 hours of symptom onset were 0.49 and 0.63 (p = 0.04). Comparative ease-of-recognition was significantly higher than the equivalent value of 4 for all three readers (p <0.01, 0.03, <0.01), tilted favorably towards the enhanced images.

CONCLUSION

Continuity-based correlative enhancement improves conspicuity and accurate detection of early changes of brain infarction on non-contrasted head CT.

CLINICAL RELEVANCE/APPLICATION

By improving diagnostic accuracy for detection of ischemic infarction on head CT, continuity-based correlative enhancement may help in making more informed decisions for management of stroke patients.

RC305-03 Diagnostic Accuracy of Whole-brain CT Perfusion in MRI-confirmed Infratentorial Infarctions

Tuesday, Dec. 1 9:05AM - 9:15AM Location: N230

Participants
Kolja M. Thierfelder, MD,MSc, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Christine Bollwein, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Birgit B. Ertl-Wagner, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Louisa von Baumgarten, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Maximilian F. Reiser, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Wieland H. Sommer, MD, Munich, Germany (*Presenter*) Founder, QMedify GmbH
Andreas Straube, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Recently introduced whole-brain CT perfusion (WB-CTP) allows for an evaluation of the posterior fossa, but data on WB-CTP in this region is limited. Our aim was to determine the diagnostic accuracy of WB-CTP for infratentorial infarctions and to identify factors influencing the detection rate.

METHOD AND MATERIALS

Out of a retrospective cohort of 1361 consecutive patients who underwent WB-CTP due to suspected stroke, we selected all patients with an MRI-confirmed infratentorial ischemic infarction. The study was designed as a case-control study with a ratio of cases to controls without infratentorial infarction of 1:3. Two blinded and experienced readers independently evaluated 4 different perfusion maps - Cerebral Blood Flow (CBF), Cerebral Blood Volume (CBV), Mean Transit Time (MTT), and Time to Drain (TTD) - for the presence and location of an infratentorial perfusion deficit.

RESULTS

Seventy subjects met the inclusion criteria for the patient group. The control group consisted of 210 patients. Overall, WB-CTP reached a sensitivity of 45.4% and a specificity of 93.1%. Infarctions of the cerebellum were detected in 20/38 (53%), while infarctions of the brain stem were detected in only 9/32 (28%) of the cases, $p < 0.05$. Among the different perfusion maps, TTD was the most sensitive (47.2%), followed by MTT (41.0%), CBF (39.2), and CBV (9.1%). With respect to specificity, CBV (98.1%) reached the highest value, followed by CBF (93.8%), TTD (92.9%), and MTT (89.2%). Mean final infarction volume (15.2ml) and diameter (27.1mm) of infarctions that were detected in WB-CTP were significantly larger than volume (5.4ml) and diameter (17.8mm) of infarctions that were not detected (each with $p < 0.001$).

CONCLUSION

Depending on infarction size and localization, whole-brain CT perfusion is able to detect around 45% of infratentorial infarctions with a specificity of around 90%.

CLINICAL RELEVANCE/APPLICATION

Whole-brain CT perfusion is able to detect around 45% of infratentorial infarctions and may be an important alternative in the case of suspected posterior circulation ischemia when MRI is not available.

RC305-04 Intracranial Vessel Imaging at 1.5 Tesla versus 3 Tesla versus 7 Tesla:A Comparison Trial

Tuesday, Dec. 1 9:15AM - 9:25AM Location: N230

Participants
Lale Umutlu, MD, Essen, Germany (*Presenter*) Consultant, Bayer AG
Oliver Kraff, MSc, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Anja Fischer, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Stefan Maderwald, PhD, MSc, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Mark E. Ladd, PhD, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Thomas C. Lauenstein, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Michael Forsting, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Marc U. Schlamann, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The increase of the magnetic field strength is associated to an increase in SNR that can be transitioned into imaging at higher spatiotemporal resolution. With the successful implementation of 7T neuro MRI, the aim of this study was to investigate and intraindividually compare non-enhanced MR imaging of intracranial arteries and veins at 1.5 Tesla, 3 Tesla and 7 Tesla utilizing TOF-MRA and susceptibility-weighted imaging.

METHOD AND MATERIALS

10 healthy volunteers were each examined on a 1.5 T (Magnetom Aera, Siemens), a 3T (Magnetom Skyra, Siemens) and a 7T MR system (Magnetom 7T, Siemens) utilizing 32-channel head coils. TOF-MRA and SWI were optimized to achieve best spatial resolution for each field strength while preserving comparable acquisition times. All datasets were read by two radiologists utilizing a 5-point scale (5= excellent vessel delineation to 1= non-diagnostic). All TOF-MRA datasets were assessed for delineation of the intracranial arteries, subdivided into 8 segments (ICA, A1/2, M1,M2,M3,PCA, P1/2, basilar artery). SWI datasets were read for delineation of 14 different smaller and larger veins. Additionally, overall image quality, vessel sharpness, vessel to background contrast and image impairment due to artifacts was assessed. For statistical analysis, a Wilcoxon Rank Test was used.

RESULTS

With increasing magnetic field strength, all sequences could be obtained at higher spatial resolution at comparable acquisition

times, enabling improved vessel delineation. TOF-MRA at 7T enabled a significantly better delineation particularly of small peripheral vessel segments compared to 3T and 1.5T (mean M3 TOF7T=4.3; TOF3T=3.8; TOF1.5T=2.9). 7 Tesla SWI imaging demonstrated its superiority in the highly-detailed delineation of larger and smaller veins with statistical significance to lower field strengths (p=0.03) (e.g. average mean value larger veins: SWI7T =4.5, SWI3T =3.3, SWI1.5T =2.7). Overall image quality was rated comparably high for all three field strengths (7T=4.6; 3T=4.7; 1.5T=4.7).

CONCLUSION

Our results demonstrate the benefits of an increase of magnetic field strength from 1.5T to 7T, offering improved and highly-detailed delineation of the intracranial arterial and venous vasculature.

CLINICAL RELEVANCE/APPLICATION

The excellent delineation of non-enhanced vascular structures in 7T neuro MRI may lead to a more accurate diagnosis of vascular disease, such as aneurysms or cavernomas using 7T MRI.

RC305-05 High Resolution Intracranial Vessel Wall Imaging of Atherosclerotic Plaque Characteristics: Correlation with Patient Symptoms

Tuesday, Dec. 1 9:25AM - 9:35AM Location: N230

Participants
Aaron M. Rutman, MD, Seattle, WA (*Presenter*) Nothing to Disclose
Chun Yuan, PhD, Seattle, WA (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; ;
William D. Hwang, MD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Daniel S. Hippe, MS, Seattle, WA (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV; Research Grant, General Electric Company
Niranjan Balu, PhD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Thomas S. Hatsukami, MD, Seattle, WA (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV
David Tirschwell, MD, MSc, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Adam de Havenon, MD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Mahmud Mossa-Basha, MD, Seattle, WA (*Abstract Co-Author*) Research support, General Electric Company

PURPOSE

High resolution intracranial vessel wall imaging (VWI) has recently gained attention for its ability to evaluate and differentiate various intracranial arteriopathies, including atherosclerosis (ICAD), inflammatory vasculopathy, arterial dissection, and reversible cerebral vasoconstriction syndrome. VWI also allows for atherosclerotic plaque characterization, depicting potential vulnerable plaque features. The aim was to compare the VWI plaque characteristics between symptomatic and asymptomatic intracranial atherosclerotic lesions using a multi-contrast VWI protocol.

METHOD AND MATERIALS

Cases of ICAD imaged with VWI were collected and retrospectively analyzed from our database between the dates 12/20/12-12/5/13. The imaging protocol included T2, T1 pre and post contrast, 3D T2 SPACE VWI and TOF MRA sequences. Symptomatic plaques were those upstream from an infarct within 6 months of VWI. Lesions with symptoms greater than 6 months prior were excluded. Each plaque was assessed for presence/absence of a fibrous cap, presence of fibrous cap thinning/disruption, cap:necrotic core ratio, and remodeling ratio (total vessel area of diseased segment)/(total vessel area of reference segment). Characteristics were compared by Fisher's exact test (fibrous cap presence, thinning/disruption) and unpaired t-test (cap:necrotic core ratio, remodeling ratio).

RESULTS

48 intracranial atherosclerotic plaques were included from 22 patients. Assessment for fibrous capsule was possible in 18/21 symptomatic and 25/27 asymptomatic plaques. 18/18 symptomatic and 11/25 asymptomatic lesions either did not have a visible fibrous cap, or had apparent disrupted luminal surface or thinning of a visible fibrous cap ($p<<0.01$). There was no significant difference in the cap:lipid core ratio or the remodeling ratio between symptomatic and asymptomatic lesions.

CONCLUSION

VWI allows for evaluation of ICAD characteristics which may indicate plaque vulnerability, and be associated with symptoms. These features might serve as biomarkers for assessing risk, as well as indicate culprit lesions. Our study shows a significantly increased likelihood of absent fibrous cap or fibrous cap rupture/thinning in the setting of symptoms.

CLINICAL RELEVANCE/APPLICATION

VWI of intracranial atherosclerotic plaque can demonstrate characteristics of vulnerable, symptom-associated plaque.

RC305-06 Potential Applications for Intracranial Vessel Wall Imaging

Tuesday, Dec. 1 9:35AM - 10:00AM Location: N230

Participants
David J. Mikulis, MD, Toronto, ON (*Presenter*) Stockholder, Thornhill Research Inc; Research Grant, General Electric Company;

LEARNING OBJECTIVES

1) Understand the issues concerning clinical implementation of intra-cranial vessel wall imaging. 2) Understand how vessel wall imaging can aid in differentiating vasculopathies that have similar angiographic appearances. 3) Understand pitfalls related to arterial wall image interpretation.

ABSTRACT

Modern high field MRI systems with increased multi-element coil design have enabled higher resolution by providing greater overall signal. This in turn has paved the way for imaging smaller parts including the walls of smaller and smaller vascular structures. For example, current technology is capable of generating 3D images with 0.4 x 0.4 x 0.4 mm isotropic voxels using 3T MRI. This has

enabled characterization of circle of Willis vessels out to secondary branches (A2,M2, and P2). Not only has analysis of vasculopathies with identical angiographic appearances been made possible thereby increasing specificity of diagnosis, it has also provided insight into disease pathophysiology. An example of this is the strong relationship found between ischemic stroke and gadolinium enhancing intra-cranial atherosclerotic plaques. The purpose of this presentation therefore is to summarize the current status of arterial wall imaging in clinical neuroradiology.

RC305-07 Update on Acute Stroke Intervention

Tuesday, Dec. 1 10:20AM - 10:45AM Location: N230

Participants
Colin P. Derdeyn, MD, Saint Louis, MO, (colin-derdeyn@uiowa.edu) (*Presenter*) Consultant, Terumo Corporation; Consultant, Penumbra, Inc; Consultant, Silk Road Medical; Stock options, Pulse Therapeutics, Inc; ;

LEARNING OBJECTIVES

1) Describe the current indications for endovascular stroke intervention. 2) Describe the available mechanical devices currently used in these cases.

ABSTRACT

The past 12 months have seen the publication of more positive pivotal clinical trials (n = 4) for the treatment of acute ischemic stroke than the last 20 years combined (n = 6). Endovascular stroke treatment (EVT) is now proven effective for a large subgroup of patients presenting with acute ischemic stroke. We will carefully review the data from the four recently published trials of endovascular treatment (EVT) for acute ischemic stroke: MR CLEAN (Multicenter Randomized Clinical Trial of Endovascular Treatment for Acute Ischemic Stroke in the Netherlands), ESCAPE (Endovascular Treatment for Small Core and Anterior Circulation Proximal Occlusion with Emphasis on Minimizing CT to Recanalization Times), and EXTEND-IA (Extending the Time for Thrombolysis on Emergency Neurological Deficits) and SWIFT PRIME (Solitaire With the Intention For Thrombectomy as Primary Endovascular Treatment for Acute Ischemic Stroke). We will examine the implications of these trials for current practice and future studies. In particular, we will focus on procedural details such as patient selection, devices, adjunctive therapies, treatment time windows and performance metrics.

Active Handout:Colin P. Derdeyn

http://abstract.rsna.org/uploads/2015/15000010/RC305-07 Stroke-2015-Powers-3020-35.pdf

RC305-08 Carotid Intraplaque Hemorrhage is Associated with Accelerated Progression in Patients with Acute Ischemic Stroke: A Prospective Multicenter-Study on Carotid Plaque Imaging in Patients with Acute Stroke

Tuesday, Dec. 1 10:45AM - 10:55AM Location: N230

Participants
Andreas Schindler, MD, Munich, Germany (*Presenter*) Nothing to Disclose
Anna Bayer-Karpinska, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Tilman Obenhuber, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Florian Schwarz, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Clemens C. Cyran, MD, Munich, Germany (*Abstract Co-Author*) Research Grant, Bayer AG Research Grant, Novartis AG Speakers Bureau, Bayer AG
Tobias Saam, MD, Munich, Germany (*Abstract Co-Author*) Research Grant, Diamed Medizintechnik GmbH; Research Grant, Pfizer Inc
Andreas D. Helck, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Andreas Harloff, Freiburg, Germany (*Abstract Co-Author*) Speaker, Boehringer Ingelheim GmbH Speaker, Bayer AG
Holger Poppert, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Martin Dichgans, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To prospectively evaluate whether carotid plaque hemorrhage - as detected by high-resolution carotid plaque MRI - is associated with an accelerated progression rate of atherosclerosis.

METHOD AND MATERIALS

58 consecutive patients (76.3±9.8 years; 45 male) with acute ischemic stroke in the anterior circulation and non-stenosing carotid plaque in any carotid artery were included in the ongoing multi-center trial (which is also registered on ClinicalTrials.gov). Patients underwent MRI of both carotid arteries at baseline and at 12 months. Carotid plaques were characterized by the American Heart Association (AHA) classification system and plaque burden as well as components such as the lipid-rich/necrotic core, calcifications, and hemorrhage were identified and quantified. Annualized changes for each item were analyzed for both arteries combined on a patient basis for the whole cohort, as well as depending on the status of intra plaque hemorrhage (IPH) at baseline (IPH+ vs. IPH-). Unpaired t-test and one-sample t-test vs. 0 were performed.

RESULTS

A total of 14 patients had complicated AHA-LT6 plaques with IPH at baseline; no new IPH was detected at follow-up. During follow-up a total of four re-events occurred (all IPH+ at baseline). For all patients no significant changes in plaque burden or component size were measurable after one year, with a non-significant increase of mean wall area of 2.3%/year. IPH+ vs. IPH- subjects had a significantly higher progression of the normalized wall index (3.5% vs. 0.5%; $p<0.05$), and an accelerated progression of mean wall area (7.3% vs. 0.8%; P=n.s. for IPH+ vs. IPH-; P=0.037 for IPH+ vs. 0). No significant quantitative changes for all plaque components were measurable, although mean necrotic core area increased from 6.2 to 7.1 mm^2 in IPH+ patients (+16%) and remained unchanged in IPH- patients.

CONCLUSION

Intraplaque hemorrhage is associated with an accelerated atherosclerotic plaque progression rate in patients with acute ischemic stroke.

CLINICAL RELEVANCE/APPLICATION

This multi-center study provides further evidence that IPH is a good marker of plaque vulnerability; further studies are needed to test if patients with IPH could profit from more intensive therapy.

RC305-09 Dual-Energy Head CT Can Accurately Distinguish Intraparenchymal Hemorrhage from Calcification in Emergency Department Patients

Tuesday, Dec. 1 10:55AM - 11:05AM Location: N230

Participants
Laleh Daftaribesheli, MD, Boston, MA (*Presenter*) Nothing to Disclose
Ranliang Hu, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Joseph Y. Young, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Markus Y. Wu, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Michael H. Lev, MD, Boston, MA (*Abstract Co-Author*) Research support, General Electric Company Stockholder, General Electric Company
Rajiv Gupta, PhD, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Stuart R. Pomerantz, MD, Boston, MA (*Abstract Co-Author*) Research Grant, General Electric Company

PURPOSE

Conventional head CT and MRI with gradient-echo susceptibility scanning are limited in their ability to distinguish hemorrhage from calcification, a critical distinction in the selection of stroke patients for IV-thrombolytic and endovascular therapies. Dual energy CT (DECT) scanning, however, may be able to better discriminate calcium from hemorrhage based on the differing proportions of X-ray attenuation of these materials at different scanning energies. The purpose of this study is to evaluate the ability of DECT for differentiation of calcification from acute hemorrhage.

METHOD AND MATERIALS

In this IRB approved study, all unenhanced DECT head exams performed in our emergency department in November and December 2014 were retrospectively reviewed. Patients with at least one focus of intra-parenchymal hyperdensity were included and material decomposition images were post-processed. Virtual non-calcium and calcium overlay images were reviewed for the presence of calcification versus hemorrhage. Relevant prior and follow-up imaging and clinical data were used to determine the reference standard.

RESULTS

Of 399 DECT head exams, 83 (21%) contained at least one intraparenchymal hyperdensity on the corresponding simulated single energy CT (SECT) image; 64/83 (77%) with reference standard proof of diagnosis were included. Mean age was 67 years; 39/64 (61%) were male. 68 distinct intraparenchymal hyperdense lesions were identified, of which 41/68 (60%) were calcification and 27/68 (40%) were hemorrhage. Sensitivity, specificity and accuracy of DECT for the detection of hemorrhage were 96% (CI 81-99%), 100% (CI 91-100%) and 99% (CI 90-100%), respectively. Seven of 27 (26%) of hemorrhages were incorrectly classified by SECT alone, compared to 1/27 (4%) for DECT.

CONCLUSION

DECT post-processed images can distinguish intraparenchymal hemorrhage from calcification rapidly and with very high accuracy in emergency department patients. Conventional gradient-echo MRI and CT scanning are unable to make this distinction accurately. This may have important implications for patient care, most notably in excluding stroke patients with intracranial hemorrhage from IV-thrombolytic and endovascular stroke therapies.

CLINICAL RELEVANCE/APPLICATION

Ability of DECT for differentiation of calcification from hemorrhage has important implications for patient care, most notably in excluding stroke patients with hemorrhage from IV-thrombolytic.

RC305-10 Favorable Outcomes Following Endovascular Treatment in Anterior Circulation Stroke Patients Defined Prospectively Using MRI and Clinical Criteria

Tuesday, Dec. 1 11:05AM - 11:15AM Location: N230

Participants
Ramon G. Gonzalez, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose
Thabele M. Leslie-Mazwi, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Pamela W. Schaefer, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Michael H. Lev, MD, Boston, MA (*Abstract Co-Author*) Research support, General Electric Company Stockholder, General Electric Company
Natalia Rost, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Lee Schwamm, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Joshua A. Hirsch, MD, Boston, MA (*Abstract Co-Author*) Shareholder, Intratech Medical Ltd

PURPOSE

To evaluate the clinical efficacy of major anterior circulation stroke thrombectomy in patients prospectively classified by specific MRI and clinical criteria.

METHOD AND MATERIALS

72 patients with MCA or terminal ICA occlusion by CTA, followed by core infarct volume determination by MRI, underwent thrombectomy after meeting institutional criteria. 40 patients were prospectively classified as Likely to Benefit (LTB) using the following institutional criteria: DWI lesion volume <70ml, age < 80, stroke onset to procedure initiation < 6 hours and baseline mRS ≤1. Thirty two were prospectively classified as Uncertain to Benefit (UTB) if one or more of the clinical criteria were not met or if the DWI lesion was 70-100 ml. Outcomes were based on 90-day modified Rankin score (mRS). Favorable outcomes were defined as 90 day mRS of 0, 1 or 2.

RESULTS

Reperfusion (mTICI 2b or 3) and prospective categorization as LTB were strongly associated with favorable outcomes (p<0.001 and p<0.005, respectively). Successful reperfusion had a significant positive impact on the distribution of mRS scores of the LTB cohort (p<0.0001). Intervention resulted in successful reperfusion in 68% of the LTB patients and 75% of UTB patients (not significant). Favorable outcomes were obtained in 53% and 25% of LTB and UTB patients that were treated, respectively (p= 0.016; Fisher exact test). In considering the effect of successful intervention, favorable outcomes were observed in 74% of LTB patients that had successful reperfusion compared to 33% of successfully reperfused UTB patients (p=0.004; Fisher exact test).

CONCLUSION

Patients prospectively classified as Likely to Benefit based on MRI and clinical criteria have a high likelihood of favorable outcome after thrombectomy, particularly if reperfusion is successful.

CLINICAL RELEVANCE/APPLICATION

This work demonstrates how to achieve high levels of favorable outcomes in severe ischemic stroke patients by using imaging for selection of appropriate patients for endovascular therapy.

RC305-11 Body Temperature Fluctuations Modulate Infarct Expansion, Penumbral Rescue, and Clinical Outcome in Acute Ischemic Stroke Following Successful Endovascular Reperfusion: Impact of Subclinical Temperature Changes on Ischemic Progression

Tuesday, Dec. 1 11:15AM - 11:25AM Location: N230

Participants
Seena Dehkharghani, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Meredith Bowen, BA, Atlanta, GA (*Presenter*) Nothing to Disclose
Diogo C. Haussen, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Michael Frankel, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Adam B. Prater, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Andrey Lima, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Tyler Gleason, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Raul G. Nogueira, MD, Boston, MA (*Abstract Co-Author*) Consultant, Stryker Corporation Consultant, Medtronic, Inc Consultant, CoAxia, Inc

PURPOSE

The exquisite temperature sensitivity of neuronal substrate has been thoroughly expounded in past studies. The effect of systemic temperature changes on stroke progression, and its impact upon the fate of at-risk tissues remains unknown. We undertook the analysis of temperature fluctuations and their interaction with rescue of penumbral tissues in a cohort of successfully revascularized acute stroke patients, hypothesizing greater relative infarct expansion as a function of sub-clinical systemic temperature changes.

METHOD AND MATERIALS

129 patients with acute stroke presenting within 12 hours were culled from our prospective registry. CT perfusion was obtained, with perfusion analysis undertaken in a user- and vendor-independent processing environment (RAPID). Automated lesion segmentation and thresholding of CTP data produced core, penumbral, and mismatch volumes. Final infarct volumes (FIV) were measured from DWI, and relative infarct growth (FIV-core/mismatch) computed. Systemic temperatures were recovered from medical records for the duration of hospitalization (up to q15 minutes), with minima, maxima, and ranges collected. All patients underwent successful endovascular reperfusion (mTICI IIb/III). Kendall's tau correlation was prescribed to assess the association between temperature change from baseline and both relative infarct growth (RIG) and favorable clinical outcome (FCO) as 90d mRS<=2.

RESULTS

59 men and 70 women (age 63±14 yrs) with acute stroke (NIHSS median[IQR]=19[9]; time to groin puncture median[IQR]=330[301]) were examined. All patients exhibited an occlusive lesion of the anterior circulation (ICA/MCA) with successful reperfusion (mTICIIIb/III). Median core (rCBF), penumbral (Tmax), and FIV (median[IQR]) were 9.6cc[25], 131cc[125], and 21cc[37], respectively. Mean temperature minima=35.1°C and maxima=37.9°C. Correlational analysis demonstrated significant associations between temperature fluctuation from baseline and both RIG (P=0.01) and FCO (P<0.001).

CONCLUSION

The impact of sub-clinical temperature changes had not previously been reported as a driving factor in penumbral rescue, however the present findings suggest that neuronal fate may be affected by even minor temperature changes

CLINICAL RELEVANCE/APPLICATION

Sub-clinical temperature dysregulation may potentiate neuronal injury following acute ischemic stroke, compelling further investigation into the mechanistic relationship.

RC305-12 Impact of the Implementation of Thrombectomy with Stent Retrievers on the Frequency of Hemicraniectomy in Patients with Acute Ischemic Stroke

Tuesday, Dec. 1 11:25AM - 11:35AM Location: N230

Participants
Peter Sporns, MD, Munster, Germany (*Presenter*) Nothing to Disclose
Jens Minnerup, Munster, Germany (*Abstract Co-Author*) Nothing to Disclose
Tarek Zoubi, Muenster, Germany (*Abstract Co-Author*) Nothing to Disclose
Uta Hanning, MD, Muenster, Germany (*Abstract Co-Author*) Nothing to Disclose
Walter L. Heindel, MD, Muenster, Germany (*Abstract Co-Author*) Nothing to Disclose
Wolfram Schwindt, MD, Muenster, Germany (*Abstract Co-Author*) Nothing to Disclose
Thomas Niederstadt, MD, Munster, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The increasing use of endovascular treatments has led to higher recanalization rates and better clinical outcomes compared to intravenous thrombolysis alone. Stent retrievers represent the latest development for recanalization of large vessel occlusions. Decompressive hemicraniectomy has proved beneficial in patients suffering from rising intracranial pressure after malignant stroke. We investigated the effect of the implementation of stent retriever treatment on the frequency of hemicraniectomy as a surrogate marker for infarct size and thus for poor neurological outcome.

METHOD AND MATERIALS

Patients with acute ischemic stroke were retrospectively studied. We compared the frequency of hemicraniectomy following proximal artery occlusion of the internal carotid artery and middle cerebral artery main stem in the years before (2009 and 2010) and after (2012 and 2013) introducing stent retrievers.

RESULTS

Overall, 497 patients with proximal arterial occlusion were included in the study. Of 253 patients admitted in the years 2009 and 2010 44 (17.4 %) and of 244 patients admitted in 2012 and 2013 20 (8.2 %) received a hemicraniectomy. This decrease in the proportion of hemicraniectomies was statistically significant ($p<0.01$).

CONCLUSION

The findings in this study illustrate a significantly reduced rate of hemicraniectomies in patients with proximal artery occlusions after implementation of thrombectomy with stent retriever. Hereby we could show a significant reduction of malignant infarctions after thrombectomy with stent retriever.

CLINICAL RELEVANCE/APPLICATION

Stent retriever is a safe and effective device and improves clinical outcome.

RC305-13 Hallmarks of Pediatric Ischemic Stroke

Tuesday, Dec. 1 11:35AM - 12:00PM Location: N230

Participants
Arastoo Vossough, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define the epidemiological features and risk profiles of stroke in different pediatric patient populations. 2)Classify the types of pediatric stroke and features of vasculopathies leading to stroke. 3) Identify major mimickers of pediatric arterial ischemic stroke. 4) Specify current approved treatment options available for pediatric stroke 5) Identify recent and ongoing clinical trials in pediatric stroke.

RC306

Contemporary Thyroid and Parathyroid Imaging: The Incidental Thyroid Nodule Through 4DCT

Tuesday, Dec. 1 8:30AM - 10:00AM Location: N227

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC306A Managing the Incidental Thyroid Nodule

Participants
Jenny K. Hoang, MBBS, Durham, NC, (jennykh@gmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the recommendations for workup an incidental thyroid nodule detected on imaging. 2) Examine the implications and costs of workup of incidental thyroid nodules.

ABSTRACT

Facts about incidental thyroid nodules on imagingMajority of thyroid nodules detected incidentally do not have suspicious clinical history or imaging findings to differentiate a malignant from benign nodule.Incidental thyroid nodules are common whereas thyroid cancer is uncommon. Only 1.6% of patients with one or more thyroid nodules will actually have thyroid cancer [1].Health care costs of workup of incidental thyroid nodules add up. Other costs to consider are patient anxiety, time lost, and potential complications of diagnostic lobectomy. Facts about incidental thyroid cancersSmall thyroid cancers are typically indolent and most patients die with rather than of thyroid cancer. The observed incidence of thyroid cancer is increasing exponentially and has doubled in the last decade [2]. Mortality has not changed significantly despite this trend which raises concern that the apparent increase in incidence is due to overdiagnosis of subclinical thyroid cancers. How should we be reporting thyroid nodules on imaging?In 2015 the American College of Radiology published a white paper on the management of Incidental Thyroid Nodules [3]. References:1. Smith-Bindman R, Lebda P, Feldstein VA, et al. Risk of thyroid cancer based on thyroid ultrasound imaging characteristics: results of a population-based study. JAMA Intern Med 2013; 173:1788-17962. Davies L, Welch HG. Current thyroid cancer trends in the United States. JAMA Otolaryngol Head Neck Surg 2014; 140:317-3223. Hoang JK, Langer JE, Middleton WD, et al. Managing Incidental Thyroid Nodules Detected on Imaging: White Paper of the ACR Incidental Thyroid Findings Committee. J Am Coll Radiol 2015; 12:143-150

RC306B Imaging Thyroid Cancer

Participants
Ashley H. Aiken, MD, Atlanta, GA, (ashley.aiken@emoryhealthcare.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the American Thyroid Association (ATA) recommendations for preoperative imaging evaluation of thyroid cancer. 2) Recognize the indications for cross-sectional imaging in the pre-operative evaluation of thyroid cancer. 3) Use pre-operative cross-sectional imaging to accurately stage the primary tumor and regional lymph nodes.

ABSTRACT

Differentiated thyroid cancer (DTC), including papillary and follicular subtypes, is the most common (90%) primary thyroid malignancy. The remaining 10% of thyroid cancers include medullary, anaplastic and lymphoma. The American Thyroid association (ATA) guidelines currently recommend ultrasound (US) as the preoperative study for uncomplicated thyroid cancer. Cross-sectional imaging adds important anatomical information and should be recommended for cases with clinical evidence of invasive disease (vocal cord palsy, fixed mass, dysphagia, or respiratory symptoms), large size or mediastinal extent not well seen on US or rapid enlargement. Cross-sectional imaging is also recommended by the ATA when there is US or clinical evidence of bulky LAD or US expertise is not available.When interpreting a CT or MRI for preoperative evaluation, the radiologist should assess the primary tumor for extrathyroidal extension. The critical structures to assess for local invasion include the infrahyoid strap muscles (T3), larynx, trachea, or esophagus (T4a), recurrent laryngeal nerve (T4a), carotid encasement (T4b) and prevertebral fascia (T4b). The second role of imaging is to assess for regional nodal disease. It is important for the radiologist to recognize that lateral neck dissections are NOT part of routine management and identification of nodal disease in the lateral neck will alter the surgical plan. Radiologists should pay close attention to the typical drainage pathways including the central neck (level VI), lateral neck (levels III, IV), superior mediastinum (VII) and retropharyngeal nodes. Nodal metastases in papillary thyroid cancer may be characteristically cystic or calcified on CT or hyperintense on T1 weighted MRI. However, metastatic nodes may also be small and reactive appearing, so that clustered nodes in the paratracheal and mediastinal locations should increase suspicion. PET/CT may play a role in dedifferentiated tumors that no longer concentrate iodine, especially for surveillance in patients with elevated thyroglobulin but negative 131I WBS.

Active Handout:Ashley Hawk Aiken

http://abstract.rsna.org/uploads/2015/15001959/RC306B.pdf

RC306C Parathyroid Imaging

Participants
Deborah R. Shatzkes, MD, New York, NY, (shatzkes@hotmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Key anatomic features of both normal and variant parathyroid anatomy. 2) The imaging modalities available for the work-up of primary hyperparathyroidism and their relative pros and cons. 3) The surgical techniques that have driven the development of contemporary parathyroid imaging.

ABSTRACT

The advent of minimally invasive parathyroid surgery (MIPS) has driven the development of improved localization techniques for parathyroid adenoma. The most successful imaging techniques are those that combine excellent anatomic detail with functional information that will help differentiate parathyroid adenoma from other nodules in the region. Ultrasound remains a very useful modality, because of its availability, cost and absent ionizing radiation. Radionuclide scanning, typically utilizing Tc99m Sestamibi, adds more specific functional information, and when combined with CT, good anatomic detail. Recently, there has been increasing interest in parathyroid CT, also known as 4DCT. This is essentially a CTA study whereby the characteristic hyperperfusion of parathyroid adenomas allows them to be differentiated from lymph nodes and exophytic thyroid nodules. There remains considerable controversy regarding technical details of 4DCT, particularly the number of phases required. The associated ionizing radiation remains a significant concern. Often, a combination of two imaging modalities is performed in order to increase reliability.The high incidence of ectopic parathyroid glands, the position of the glands at the root of the neck, the proximity to often multinodular thyroid tissue and what appears to be a rising incidence of multi glandular disease are challenges that relate to all imaging modalities.

RC307

GU Incidental Findings 2015 - What Is New and Helpful in Managing Them? (An Interactive Session)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: E450B

GU

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Lincoln L. Berland, MD, Birmingham, AL, (lberland@uabmc.edu) (*Coordinator*) Consultant, Nuance Communications, Inc; Stockholder, Nuance Communications, Inc;
Stuart G. Silverman, MD, Brookline, MA, (sgsilverman@partners.org) (*Presenter*) Author, Wolters Kluwer nv
Elaine M. Caoili, MD, MS, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Susan M. Ascher, MD, Washington, DC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Appreciate the need for and value of recommendations for managing incidental findings. The participants should also be able to choose from a variety of methods to bring these recommendations to the point of interpretation. 2) Identify incidental adnexal cystic lesions that require further evaluation to include the type and timing of follow up examinations. 3) Apply appropriate imaging criteria and thresholds to better distinguish benign adrenal adenomas from more clinically important lesions. 4) Manage incidental renal masses, even when they are incompletely characterized, such as when they are too small to characterize or detected on an examination that is not designed to evaluate them fully. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

RC308

Emergency Radiology Series: Current Imaging of the Acute Abdomen

Tuesday, Dec. 1 8:30AM - 12:00PM Location: N228

GI CT MR ER

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

Participants
Douglas S. Katz, MD, Mineola, NY (*Moderator*) Nothing to Disclose
Michael N. Patlas, MD,FRCPC, Hamilton, ON, (patlas@hhsc.ca) (*Moderator*) Nothing to Disclose
Hani H. Abujudeh, MD, MBA, Boston, MA (*Moderator*) Nothing to Disclose

Sub-Events

RC308-01 CT and MR of Acute Appendicitis

Tuesday, Dec. 1 8:30AM - 8:55AM Location: N228

Participants
Perry J. Pickhardt, MD, Madison, WI (*Presenter*) Co-founder, VirtuoCTC, LLC; Stockholder, Cellectar Biosciences, Inc; Research Consultant, Bracco Group; Research Consultant, KIT ; Research Grant, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Assess the relative advantages and disadvantages for CT and MR imaging in the setting of suspected appendicitis. 2) Compare the diagnostic performance of CT and MR for both appendicitis and alternative conditions. 3) Describe the increasing use of MR for abdominal imaging in the ED setting.

ABSTRACT

N/A

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Perry J. Pickhardt, MD - 2014 Honored Educator

RC308-02 T1 Bright Appendix Sign is Helpful for the Diagnosis of Acute Appendicitis in Pregnant Women

Tuesday, Dec. 1 8:55AM - 9:05AM Location: N228

Participants
Ilah Shin, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Yong Eun Chung, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Myeong-Jin Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the diagnostic value of T1 bright appendix sign for the diagnosis of acute appendicitis in pregnant women

METHOD AND MATERIALS

This retrospective study included 125 pregnant women with suspected appendicitis who underwent MRI, including axial T2WI with/without fat saturation, coronal and sagittal T2WI, and 3D T1WI. Total of 22 patients were surgically confirmed as acute appendicitis. T1 bright appendix sign was defined as T1 high signal intensity (SI) material filling more than half length of appendix while this T1 high SI did not result from appendicolith on 3D T1WI. MR images were reviewed by two experienced radiologists in consensus and visibilities of the appendices were evaluated. The maximal diameter of visible appendix with presence or absence of T1 bright appendix sign was evaluated from MR. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of T1 bright appendix sign were calculated

RESULTS

In patients with acute appendicitis (n=22), appendix was visualized in all patients and the mean diameter of the appendix was 9.4 ± 2.7 mm (range, 6.0-14.6 mm). In patients with a normal appendix (n=103), appendix was not visualized in 14 patients (13.6%). The mean diameter of the visualized normal appendix was 5.0 ± 0.7 mm (range, 3.1-6.8 mm). Among patient without appendicitis, T1 bright appendix sign was seen in 40 patients (45%), whereas it was noted in only 1 patient with acute appendicitis (4.5%). Fourteen patients had borderline sized appendix (appendix diameter between 6 - 7 mm) and 4 out of 14 patients were diagnosed as appendicitis. Among them, T1 bright appendix sign was seen in 4 patients without appendicitis. The sensitivity, specificity, PPV and NPV of T1 bright appendix sign for the diagnosis of normal appendix were 45%, 96%, 98%, and 30% for all patients and 60%, 100%, 100%, and 50% for patients with borderline sized appendix

CONCLUSION

T1 bright appendix sign was a specific finding for the diagnosis of normal appendix in pregnant women suspected of acute appendicitis

CLINICAL RELEVANCE/APPLICATION

If T1 bright appendix sign is seen in pregnant women with suspected appendicitis, the probability of acute appendicitis might be low

RC308-03 Optimization of MR Protocols in Pregnant Women with Suspected Acute Appendicitis

Tuesday, Dec. 1 9:05AM - 9:15AM Location: N228

Participants
Ilah Shin, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Yong Eun Chung, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Myeong-Jin Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the optimal MR protocols in pregnant women who were suspected of acute appendicitis

METHOD AND MATERIALS

This retrospective study included 125 pregnant women (mean IUP, 21.6; range, 16-30 weeks) with suspected appendicitis. MR images were reviewed by two experienced radiologists in consensus in 3 separate sessions. On session 1, axial single shot(SSH) T2WI, respiratory gated fat saturated T2WI, 3D T1 weighted images (set 1) were reviewed. In session 2 and 3, set 1 + coronal T2WI (set 2) and set 2 + sagittal T2WI were reviewed respectively. The visibility of appendix (1: not identified - 5: entirely visualized) and probability of appendicitis (1: not appendicitis - 5: definite appendicitis) were evaluated in each session. If diseases other than appendicitis were suspected, reviewers were asked to provide specific diagnosis with a 5-point scale confidence level. Visualization score and diagnostic performance were compared by ANOVA and chi-square test. Area under the curve (Az) value was compared with DeLong methods

RESULTS

Visualization scores of appendix was slightly increased in both set 2 (4.5±1.3) and set 3 (4.5±1.3) compared to set 1 (4.2±1.3) without statistical significance (ANOVA, P=0.214). There was no significant differences in confidence level among three groups, in both patients with appendicitis (4.9 in all sets, P>0.999) and without appendicitis (1.2 in all sets, P=0.914). Eighteen patients had been diagnosed to other diseases including ureter stone (1), obstruction (3), torsion (7), acute pyelonephritis (2), hemoperitoneum (2), colon cancer (2), and terminal ileitis (1). Sensitivity and accuracy were increased in set 2 (77.8%, 96.8%) and set 3 (83.3%, 97.6%) compared to set 1 (66.7%, 95.2%) for the diagnosis of other disease. Az value was significantly higher in set 3 (Az, 0.917) compared to both set 2 (Az, 0.889) and set 1 (Az, 0.833, $P < 0.05$)

CONCLUSION

Axial T2WI with/without fat saturation and 3D T1WI were sufficient for the diagnosis of acute appendicitis. However, additional coronal and sagittal SSH T2WI were required for the accurate diagnosis of disease other than appendicitis in pregnant women

CLINICAL RELEVANCE/APPLICATION

Although axial T2WI and 3D T1WI is sufficient for the diagnosis of appendicitis, coronal and sagittal T2WI might be needed for the accurate diagnosis of diseases other than acute appendicitis in pregnant women who are suspected of acute appendicitis

RC308-04 "Saving Time without Sabotaging Diagnosis"- The FAST MR Protocol for Evaluating Acute Appendicitis in the Emergency Setting

Tuesday, Dec. 1 9:15AM - 9:25AM Location: N228

Participants
Memoona Mian, MD, FRCR, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Ismail T. Ali, MBChB, MD, Vancouver, BC (*Presenter*) Nothing to Disclose
Teresa I. Liang, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Patrick D. McLaughlin, FFRRCSI, Cork, Ireland (*Abstract Co-Author*) Speaker, Siemens AG
Savvas Nicolaou, MD, Vancouver, BC (*Abstract Co-Author*) Institutional research agreement, Siemens AG
Triona M. Walshe, FFR(RCSI), Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Silvia D. Chang, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Acute appendicitis is a major concern especially in young females presenting to ER with right iliac fossa pain. Prompt diagnosis/exclusion has major implications in the urgent care setting. Due to concerns for radiation exposure with CT scan, MR is gaining popularity as the imaging of choice given the low yield of ultrasound in such cases. In this study, we assess the diagnostic performance of FAST MR protocol comprising T2 HASTE and DW imaging for investigating such patients in the Emergency department.

METHOD AND MATERIALS

50 patients (49 Females; mean age 25.4 +/-5.2 yrs) with MR imaging between July 2017 and March 2015 for possible acute appendicitis were reviewed. MR abdomen/pelvis performed on 1.5 T MR per departmental protocol included axial T1 gradient echo in-out of phase, transverse FSE T2 with fat sat/motion correction, axial/coronal T2 HASTE and axial DWI images. In a randomized blinded fashion, two independent radiologists with > 5 years' experience in acute imaging reviewed both protocols for presence/absence of acute appendicitis with interpretation confidence on a five point scale(5 : highly confident to 1: nondiagnostic).Mean acquisition and interpretation times for both protocols were calculated. Sensitivity, specificity and accuracy for the FAST protocol was calculated, using clinical disposition of the patient as gold standard.

RESULTS

Mean scan time for FAST and FULL protocol was calculated to be 21.1 min and 40.5 min respectively. Mean interpretation time for FAST protocol for reader one and two was 4.1+/-1.5 min and 4.5 +/- 1.4 min and for FULL protocol was 8.1+/-1.8 min and 7.1+/-1.4 min respectively. The appendix was not confidently identified in 3 scans which were considered negative for the purpose of this study given the absence of indirect signs of inflammation like fat standing, free fluid. Sensitivity, specificity and accuracy for the FAST protocol were calculated to be 100% each for reader one and 75%, 100% and 94% respectively for reader two.

CONCLUSION

The FAST MR protocol with high diagnostic accuracy in detecting/excluding appendicitis and significant reduction in scan/interpretation time can be a valuable tool for assessing patients with possible acute appendicitis in the ER setting.

CLINICAL RELEVANCE/APPLICATION

FAST MR protocol significantly reduces scan/read times without sabotaging diagnostic accuracy for evaluating acute appendicitis, thus is an efficient and cost-effective technique in the ER setting.

RC308-05 CT Angiography for Gastrointestinal Hemorrhage

Tuesday, Dec. 1 9:25AM - 9:50AM Location: N228

Participants
Jorge A. Soto, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review an appropriate algorithm for the evaluation of patients presenting with overt lower intestinal bleeding, with emphasis on CT angiography. 2) To describe the proper CT angiography technique for overt gastrointestinal bleeding. 3) Illustrate with multiple examples the CT angiographic findings of active gastrointestinal bleeding, as well as potential pitfalls in interpretation.

ABSTRACT

Overte gastrointestinal bleeding is a common and serious condition that may threaten a patient's life depending on the severity and duration of the event. Precise identification of the location, source and cause of bleeding are the primary objectives of the diagnostic evaluation. The diagnostic algorithm implemented in these acutely ill patients include various imaging modality options, as well as upper endoscopy and colonoscopy. For patients presenting with hematochezia, implementation of colonoscopy in the emergency setting poses multiple challenges, especially the inability to adequately cleanse the colon and poor visualization owing to the presence of intraluminal blood clots. Scintigraphy with technetium 99m-labeled red blood cells is highly sensitive but also has some limitations, such as imprecise localization of the source of bleeding. CT angiography offers logistical and diagnostic advantages in the detection of active hemorrhage. A three-phase examination (non-contrast, arterial and portal venous) is typically performed. Potential technical and interpretation pitfalls should be considered and will be explained. The information derived from CT angiography helps direct therapy and select the most appropriate hemostatic intervention (when necessary): endoscopic, angiographic, or surgical. Precise anatomic localization of the bleeding point also allows a targeted endovascular embolization. The high diagnostic performance of CT angiography makes this test a good alternative for the initial emergent evaluation of patients with acute lower intestinal bleeding.

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Jorge A. Soto, MD - 2013 Honored Educator
Jorge A. Soto, MD - 2014 Honored Educator
Jorge A. Soto, MD - 2015 Honored Educator

RC308-06 The Association of the Hypovolemic Shock Complex and Patient Mortality in Patients with Acute Internal Hemorrhage of the Abdomen and Pelvis

Tuesday, Dec. 1 9:50AM - 10:00AM Location: N228

Awards
RSNA Country Presents Travel Award

Participants
Benjamin Fritz, MD, Freiburg, Germany (*Presenter*) Nothing to Disclose
Jan Fritz, MD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG; Research Consultant, Siemens AG; Speaker, Siemens AG
Philippe A. Dovi-Akue, MD, Freiburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Maximilian Russe, MD, Freiburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Mathias F. Langer, MD, PhD, Freiburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Elmar C. Kotter, MD, MSc, Freiburg, Germany (*Abstract Co-Author*) Editorial Advisory Board, Thieme Medical Publishers, Inc

PURPOSE

The hypovolemic shock complex (HSC) constitutes computed tomography (CT) signs that are believed to be related to hypovolemic shock; however, its association with patient prognosis is unclear. We, therefore, sought to determine the frequency of HSC signs in patients with acute internal hemorrhage of the abdomen and pelvis and their association with patient mortality.

METHOD AND MATERIALS

A retrospective search of our hospital database between 2012 and 2014 derived 197 patients with clear contrast-enhanced MDCT demonstration of acute internal hemorrhage of the abdomen and pelvis. Experienced observers evaluated the CT studies for 10 different radiological signs of HSC. The frequencies of HSC signs were correlated with death during hospitalization.

RESULTS

44/197 (22.3%) of the patients died. The mortality group showed an average of 3.0 HSC signs, whereas the survival group showed 1.1 ($p<0.001$). Mortality and survival groups showed differences of the frequency of hyperenhancing adrenal glands (70.5% (31/44) vs. 19.0% (29/153), $p<0.001$), halo sign (54.5% (24/44) vs. 32% (48/150), $p=0.01$), spleenic hypoperfusion (37.2% (16/43) vs. 4% (6/151), $p<0.0001$), altered renal enhancement (15.9% (7/44) vs. 3.3% (5/153), $p=0.033$), shock bowel (22.7% (10/44) vs. 3.3% (5/150), $p=0.005$), liver hypoperfusion (15.9% (7/44) vs. 3.3% (5/153), $p=0.004$), and hyperenhancement/edema of the gallbladder

(12.1% (4/33) vs. 0% (0/137), p=0.044). No significant differences existed for a flat IVC (59.1% (26/44) vs. 45.1% (69/153), p=0.103), small diameter aorta (9.5% (4/42) vs. 6.5% (10/153), p=0.516) and pancreatic hyperenhancement/edema (6.8% (3/44) vs. 0% (0/153), p=0.083). 10% (7/73) of patients with no signs of HSC died compared to 11% (5/44) with 1, 27% (9/33) with 2, 33% (8/24) with 3, 67% (4/6) with 4, 44% (4/9) with 5, 67% (2/3) with 6, 100% (2/2) with 7, 100% (2/2) with 8 and 100% (1/1) with 9 HSC signs.

CONCLUSION

HSC signs are common in patients with acute internal hemorrhage. Patient mortality significantly increases if 2 or more signs are present. While several signs are associated with increased mortality, inferior vena cava, aorta and pancreas signs have the weakest association.

CLINICAL RELEVANCE/APPLICATION

Timely MDCT diagnosis and reporting of the HSC can contribute to appropriate management of the acute patient care and prognosis.

RC308-07 Question and Answer

Tuesday, Dec. 1 10:00AM - 10:15AM Location: N228

Participants

RC308-08 Imaging of Bowel Ischemia

Tuesday, Dec. 1 10:15AM - 10:40AM Location: N228

Participants
Vincent M. Mellnick, MD, Saint Louis, MO, (mellnickv@mir.wustl.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To apply protocols for CT and MRI that are best for identifying and characterizing bowel ischemia. 2) To compare the underlying causes and imaging findings of bowel ischemia, including nonocclusive ischemia, arterial and venous occlusion, vasculitis, and obstruction. 3) To dfferentiate the CT and MRI findings of bowel ischemia due in various stages of chronicity. 4) To use this information to better detect bowel ischemia in clinical practice and recommend appropriate management.

ABSTRACT

N/A

RC308-09 CT for Acute Nontraumatic Abdominal Pain - Is Oral Contrast Really Required? Initial Conclusions

Tuesday, Dec. 1 10:40AM - 10:50AM Location: N228

Participants
Rivka Kessner, Tel Aviv, Israel (*Presenter*) Nothing to Disclose
Sophie Barnes, Tel Aviv, Israel (*Abstract Co-Author*) Nothing to Disclose
Pinhas Halpern, Tel Aviv, Israel (*Abstract Co-Author*) Nothing to Disclose
Vadim Makrin, Tel Aviv, Israel (*Abstract Co-Author*) Nothing to Disclose
Arye Blachar, MD, Tel Aviv, Israel (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare the diagnostic performance of abdominal CT performed with and without oral contrast, in patients presenting to the ED with acute nontraumatic abdominal pain.

METHOD AND MATERIALS

Our prospective study was conducted on a sample of adult patients presenting with nontraumatic abdominal pain to the ED of a large tertiary medical center. 250 patients with acute abdominal pain that underwent IV contrast-enhanced abdominal CT were enrolled over a 9-month period. 125 patients were recruited for the study group using convenience sampling, and underwent CT without oral contrast. A control group of 125 patients was recruited, matching the cohort groups' gender and age and underwent abdominal CT during the same week - with oral contrast material. Exclusion criteria were: pregnancy, history of IBD, recent abdominal operation, suspected renal colic, AAA rupture or intestinal obstruction. The exams were first reviewed by the senior attending radiologist to determine if an additional scan with oral contrast was required. Two senior radiologists then performed consensus reading to determine the significance of the lack of oral contrast administration. The reviewers also determined specific technical and imaging findings, including the presence of oral contrast in the pathological area and the influence of the technique on some radiological findings.

RESULTS

Each group consisted of 67 males and 58 females. The average age of the two groups was 46.9 years. The main diagnoses were appendicitis (20%), diverticulitis (8.4%), colitis (6.4%) and a normal CT exam (40.4%). There was no significant difference between the groups regarding the history of the patients and the technique of the studies. Among the 125 patients of the study group, no patient had to undergo additional scan in order to establish the correct diagnosis. In only 1 patient from each group (0.8%), contrast material was considered to be necessary. In 8 patients from the study group (6.4%) and 5 patients from the control group (4%) oral contrast was considered helpful.

CONCLUSION

Our study indicates that examination of patients with acute nontraumatic abdominal pain with CT scans without oral contrast material - are diagnostic and have comparable performance to scans performed after oral contrast administration.

CLINICAL RELEVANCE/APPLICATION

Our study indicates that patients presenting to the ED with acute nontraumatic abdominal pain, may be examined with CT without

oral contrast material.

RC308-10 Assessing the Prevalence and Clinical Relevance of Positive Abdominal and Pelvic CT Findings in Senior Patients Presenting to the Emergency Department.

Tuesday, Dec. 1 10:50AM - 11:00AM Location: N228

Participants
Abdullah Alabousi, MD, Hamilton, ON (*Abstract Co-Author*) Nothing to Disclose
Michael N. Patlas, MD,FRCPC, Hamilton, ON (*Abstract Co-Author*) Nothing to Disclose
Malek Meshki, MD, Hamilton, ON (*Presenter*) Nothing to Disclose
Sandra Monteiro, PhD, Hamilton, ON (*Abstract Co-Author*) Nothing to Disclose
Douglas S. Katz, MD, Mineola, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To retrospectively evaluate the prevalence and clinical relevance of positive abdominal and pelvic CT(A/P CT) findings for patients ages 65 and older, when compared with all other Emergency Department (ED) patients undergoing A/P CT during the same time period.

METHOD AND MATERIALS

An IRB-approved retrospective review of all adult patients who underwent an emergency 64-MDCT of the abdomen and pelvis for acute non-traumatic abdominal complaints over a two-year period at a single institution was performed. The prevalence and clinical relevance of positive CT findings was assessed for patients <65 and >65. Statistical comparisons were made with Student t-tests.

RESULTS

2102 patients between 10/1/2011 and 9/30/2013 were reviewed. 1009 patients were excluded as their CT was performed to assess for trauma, for post-operative changes, or because the patients had a known diagnosis or the CT examination was performed for cancer staging. 631 patients were included in the <65 group (298 men and 333 women; mean age 46, age range 18-64), and 462 were included in the >65 group (209 men and 253 women; mean age 78, age range 65-99). Overall, there were more positive CT findings explaining the abdominal/pelvic pain for patients <65 (388 positive cases, 61.5%), compared with the >65 group (258 positive cases, 55.8%), which was a statistically significant difference ($p<0.03$). However, patients >65 were more likely to have clinically/surgically relevant findings. 50% of patients >65 presenting with appendicitis had complications evident on the initial CT, compared with 27% of those <65 ($p<0.05$). In addition, bowel obstruction (41 vs 27 patients, $p<0.05$), ruptured abdominal aortic aneurysm (7 vs 2 patients, $p<0.05$) and malignancy (19 vs 12 patients, $p<0.05$) were all more common in individuals presenting to the ED >65 years of age.

CONCLUSION

The findings of our retrospective study refute the hypothesis that there is increased prevalence of positive abdominal and pelvic CT findings in patients >65. However, older patients in our series were more likely to present with clinically/surgically relevant findings, and a lower threshold for ordering imaging examinations in this patient population should be considered.

CLINICAL RELEVANCE/APPLICATION

64-MDCT shows more clinically/surgically relevant findings in individuals older than 65 than in younger patients presenting to the Emergency Department with acute non-traumatic abdominal complaints.

Honored Educators

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Douglas S. Katz, MD - 2013 Honored Educator
Douglas S. Katz, MD - 2015 Honored Educator

RC308-11 MR of the Acute Abdomen

Tuesday, Dec. 1 11:00AM - 11:25AM Location: N228

Participants
Stephan W. Anderson, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To overview the current utilization of MR of the acute abdomen, with an emphasis on protocol optimization, and correct interpretation, using case examples. 2) To examine potential pitfalls in the interpretation of MR of the acute abdomen. 3) To review the current literature of MR of the acute abdomen.

RC308-12 The "Onyx Rim" Sign in Pelvic MRI: Perifollicular Hemorrhage as a Potential Predictor of Viability in the Setting of Ovarian Torsion

Tuesday, Dec. 1 11:25AM - 11:35AM Location: N228

Participants
Iva Petkovska, MD, Tucson, AZ (*Presenter*) Nothing to Disclose
Zeenia Irani, MD, MS, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Bobby T. Kalb, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Christopher Geffre, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Janiel Cragun, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
James R. Costello, MD, PhD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Hina Arif Tiwari, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose

Ferenc Czeyda-Pommersheim, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Diego R. Martin, MD, PhD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To correlate noncontrast MRI features of perifollicular hemorrhage with ovarian viability in the clinical setting of torsion.

METHOD AND MATERIALS

This is an IRB-approved retrospective review of 8 patients with ovarian torsion on MRI confirmed with intraoperative exam. Preoperative MR exams were performed on either a 1.5T/3.0T system (Siemens Magnetom Aera/Skyra) using 18-channel anterior abdominal and pelvic surface coils. Images were acquired without breath holding using multiplanar T2-weighted Half-Fourier Single-shoT Echo-train (HASTE) sequences, repeated with fat-suppression using SPectral Adiabatic Inversion Recovery (SPAIR). All MRIs were retrospectively reviewed in a blinded fashion separately by two radiologists for the presence or absence of a T2-hypointense perifollicular rim. This finding, when present, was utilized as a predictor of nonviability of the torsed ovary. Each torsed ovary was categorized as either a) viable or b) nonviable based on presence/absence of a perifollicular T2-hypointense rim. Clinical outcomes were determined by either a) histopathologic correlation, or b) imaging follow-up and review of the patient's medical records.

RESULTS

Of 8 patients with ovarian torsion on MRI, 5 were categorized as non-viable on MRI due to the presence of a perifollicular T2 hypointense rim, and 3 as viable due to a lack of perifollicular T2-hypointense rim. Using the reference standards of pathology (n=5) and medical chart review and imaging follow-up (n=3), MRI demonstrated a sensitivity of 100 %, and specificity of 100 % for predicting viability of a torsed ovary based on presence of a perifollicular T2-hypointense rim. Histopathological correlation demonstrated perifollicular hemorrhage separating the theca interna and externa in every patient with non-viable ovaries, corresponding to the perifollicular T2-hypointenstiy identified on preoperative MRI.

CONCLUSION

Preoperative noncontrast MRI may hold promise for the prediction of ovarian viability in clinical setting of torsion.

CLINICAL RELEVANCE/APPLICATION

Preoperative MRI for the diagnosis of ovarian torsion may provide a biomarker for prediction of ovarian viability, with potential impact on preoperative planning and management.

RC308-13 Diagnostic Performance of Individual and Combined MR Signs of Acute Cholecystitis

Tuesday, Dec. 1 11:35AM - 11:45AM Location: N228

Participants
Avneesh Gupta, MD, Boston, MA (*Presenter*) Nothing to Disclose
Christina A. LeBedis, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Stephan W. Anderson, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Jorge A. Soto, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine the performance of individual and combined MR signs of acute cholecystitis, and to propose a rapid non-contrast MR protocol for emergency diagnosis of right upper quadrant pain.

METHOD AND MATERIALS

The institutional review board approved this HIPAA-compliant retrospective study. Informed consent was waived. 288 patients presenting to the emergency department with acute right upper quadrant pain between 10/3/2010 and 11/28/2012 undergoing MR within 48 hours of US were included. MR was performed in all included patients due to equivocal US and persistent symptoms. Individual MR signs were graded in a blinded fashion using single shot T2, diffusion (b=0, b=600) and 3D GRE post contrast sequences. Sensitivity and specificity values for individual and combined imaging signs were calculated using surgical diagnosis as the reference standard for acute cholecystitis.

RESULTS

Of 288 patients, 128 were treated conservatively and excluded from analysis. 160 underwent cholecystectomy and 77 were diagnosed with acute cholecystitis at surgery. Sensitivities of the MR findings of gallstones, distention, wall thickening, pericholecystic fluid, gallbladder fossa restricted diffusion, wall restricted diffusion, gallbladder fossa hyper enhancement and wall hyper enhancement for the detection of acute cholecystitis were 96%, 59.7%, 72.7%, 49.4%, 47.3%, 26.7%, 55% and 11%, respectively. Corresponding specificities were 24.6%, 71%, 55.9%, 78.2%, 74.8%, 88.3%, 83.2% and 98.4%. Combining stones, distention, pericholecystic fluid and gallbladder fossa restricted diffusion yielded sensitivity of 35% and specificity of 92.7%, and these findings were identifiable using single shot T2 and diffusion sequences only. The combination of stones, distention and gallbladder fossa hyper enhancement was 43.8% sensitive and 89.6% specific for acute cholecystitis.

CONCLUSION

Individual and combined MR features show high specificity for acute cholecystitis. Most signs can be detected by diffusion and single shot T2 weighted sequences only. Gallbladder fossa restricted diffusion is a novel imaging sign, and when combined with the presence of gallstones, pericholecystic fluid and distention yields a specificity of 92.7% for acute cholecystitis.

CLINICAL RELEVANCE/APPLICATION

A highly specific, rapid non-contrast MR protocol consisting of diffusion and single shot T2 weighted sequences can be effective for the diagnosis of acute cholecystitis when US findings are equivocal.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at:

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Jorge A. Soto, MD - 2013 Honored Educator
Jorge A. Soto, MD - 2014 Honored Educator
Jorge A. Soto, MD - 2015 Honored Educator

RC308-14 **Question and Answer**

Tuesday, Dec. 1 11:45AM - 12:00PM Location: N228

Participants

RC309

Pitfalls in Abdominal Imaging

Tuesday, Dec. 1 8:30AM - 10:00AM Location: E353C

GI CT MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC309A Pitfalls in Bowel Imaging

Participants
David H. Kim, MD, Madison, WI (*Presenter*) Consultant, Viatronix, Inc; Co-founder, VirtuoCTC, LLC; Medical Advisory Board, Digital ArtForms, Inc; Stockholder, Cellectar Biosciences, Inc

LEARNING OBJECTIVES

1) List the advantages/disadvantages of positive and negative oral contrast 2) Recognize common pitfalls that mimic disease 3) Devise practical approaches to manage common bowel imaging scenarios

RC309B Atypical Liver Lesions

Participants
Rendon C. Nelson, MD, Durham, NC, (rendon.nelson@duke.edu) (*Presenter*) Consultant, General Electric Company Consultant, Nemoto Kyorindo Co, Ltd Consultant, VoxelMetrix, LLC Research support, Bracco Group Research support, Becton, Dickinson and Company Speakers Bureau, Siemens AG Royalties, Wolters Kluwer nv

LEARNING OBJECTIVES

1) To understand the typical imaging appearance of various focal liver lesions on CT and MR and how they can present in an atypical fashion (i.e. the imaging spectrum).

ABSTRACT

Active Handout:Rendon C. Nelson

http://abstract.rsna.org/uploads/2015/14000560/Active RC309B.pdf

RC309C Pitfalls in Hepatic Doppler Sonography

Participants
Jonathan B. Kruskal, MD, PhD, Boston, MA, (jkruskal@bidmc.harvard.edu) (*Presenter*) Author, UpToDate, Inc

LEARNING OBJECTIVES

1) Discuss the common technical pitfalls that occur when performing the liver Doppler examination, and how these can be mitigated. 2) Discuss the perceptual and interpretive errors that occur when performing the liver Doppler examination, and how these can be minimized. 3) Describe the clinical impact of technical and interpretive errors.

ABSTRACT

Honored Educators

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Jonathan B. Kruskal, MD, PhD - 2012 Honored Educator

RC309D Pearls and Pitfalls in Pancreatic Diseases

Participants
Khaled M. Elsayes, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe most commonly encountered imaging pitfalls of the pacreas. 2) Describe relevant technical background. pathophysiology and hemodynamics of these pitfalls. 3) Discuss tips to avoid erroneous diagnosis and pearls to reach correct diagnosis.

ABSTRACT

There is a wide range of common pitfalls in pancreas imaging, which can lead to frequent incorrect diagnoses mainly because many radiologists are not completely familiar with anatomical, morphological, physiological, hemodynamic and biological principles as well as deficiency of modern clinical and radiological knowledge. This leads to common misinterpretations which would further results in

wrong management with potentially negative outcome. In this course, we will review important typical features of common pancreatic pathologies and mimics of these pathologies that may require different treatment and improved prognosis.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Khaled M. Elsayes, MD - 2014 Honored Educator

RC310

First Trimester Ultrasound (An Interactive Session)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S402AB

GU OB US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Active Handout:Carol Beer Benson

http://abstract.rsna.org/uploads/2015/15001996/Active RC310.pdf

Sub-Events

RC310A Ectopic Pregnancy

Participants
Anne M. Kennedy, MD, Salt Lake City, UT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Diagnose tubal ectopic. 2) Differentiate Cesarean scar implantation from a normal, low-lying pregnancy. 3) Recognize the more unusual sites of ectopic pregnancy (cervical, interstitial, abdominal). 4) Understand the indications for expectant vs. medical vs. surgical management .

ABSTRACT

Ectopic pregnancy can be a life-threatening condition for young, healthy women. The availability of senstive urine pregnancy tests means that we are seeing patients at a time when It may be very difficult to see any sonographic findings of pregnancy. The session will review and illustrate examples of the recommended descriptive terms 'pregnancy of unknown location',' probable ectopic' and 'definite ectopic' both of which refer to tubal ectopics.We will also review the appearance of heterotopic pregnancy and non-tubal ectopics including Cesarean scar implantation, interstitial and cervical implantation, and abdominal and ovarian ectopic with demonstration of the role of color Doppler, 3D ultrasound and other imaging modalities.Modern management of ectopic pregnacy has become much less aggressive, in part because the diagnosis is made so much earlier. The indications for the various treatment options will be outlined with illustrative case of local injection as well as intraoperative photos during laparoscopy.

Active Handout:Anne M. Kennedy

http://abstract.rsna.org/uploads/2015/15001997/RC310A.pdf

RC310B Diagnosis of Miscarriage

Participants
Peter M. Doubilet, MD, PhD, Boston, MA, (pdoubilet@partners.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Know the sonographic criteria for definite miscarriage and probable miscarriage in the early first trimester. 2) Understand that any saclike intrauterine structure (rounded edges, no yolk sac or embryo) in a woman with a positive pregnancy test is highly likely to be a gestational sac. 3) Understand that nonvisualization of an intrauterine gestational sac in a woman with hCG above the 'discriminatory' level (2000 mIU/ml) does not exclude the possibility of a normal pregnancy.

ABSTRACT

This lecture will cover the diagnosis of early first trimester miscarriage in two settings: (i) ultrasound demonstrates no intrauterine gestational sac ('pregnancy of unknown location'); (ii) ultrasound demonstrates an intrauterine gestational sac but no embryo or heartbeat. In the first of these settings, the role of the quantitative hCG level will be discussed, including whether a single measurement can be used to rule out a normal intrauterine pregnancy. In the second setting, the currently accepted criteria for definite miscarriage and for probable miscarriage will be presented. The lecture will also address findings that indicate a high likelihood of impending pregnancy failure when an embryo with heartbeat is seen on ultrasound.

Active Handout:Peter Michael Doubilet

http://abstract.rsna.org/uploads/2015/15001998/RC310B Early1stTriMiscarriage--RSNA2015.pdf

RC310C Mid-late First Trimester

Participants
Carol B. Benson, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the importance of evaluating the developing fetal head during the late first trimester for early detection of large neural tube defects. 2) Incorporate measurement of the nuchal translucency into their assessment of the fetuses of gestational age 11-14 weeks. 3) Recognize sonographic abnormalities of the ventral wall to distinguish normal physiologic bowel herniation from defects including omphalocele and gastroschisis.

ABSTRACT

This lecture will discuss the sonographic appearance of fetal anatomy in the latter part of the third trimester in order to help participants recognize abnormalities of the fetus at this early gestational age. While many anomalies cannot be detected until later in pregnancy, the discussion will focus on those anomalies that can be detected in the first trimester. Specific topics covered will be central nervous system anomalies, including anencephaly, encephalocele and holoprosencephaly, ventral wall defects including omphalocele and gastroschisis, bladder outlet obstruction, and skeletal anomalies including skeletal dysplasias. Detection of anomalies early in gestation, before the second trimester, permits time to assess the fetus for other anomalies, syndromes, and aneuploidy.

RC311

Imaging Alzheimer's Disease -The Search for the Holy Grail

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S505AB

NR MR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants

LEARNING OBJECTIVES

1) Discuss the potential roles and limitations of PET imaging for amyloid and tau protein in evaluating patients with dementia. 2) Describe anatomic and functional MRI techniques for evaluating Alzheimer's disease. 3) Understand the clinical challenges of diagnosing and managing patients with dementia.

Sub-Events

RC311A PET Imaging, Tracers

Participants
Terence Z. Wong, MD, PhD, Chapel Hill, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC311B MRI and fMRI

Participants
Jeffrey R. Petrella, MD, Durham, NC (*Presenter*) Advisory Board, Johnson & Johnson Speakers Bureau, Quintiles Inc Advisory Board, Piramal Enterprises Limited

LEARNING OBJECTIVES

View learning objectives under main course title.

RC311C Clinical Examples

Participants
P. M. Doraiswamy, MD, Durham, NC (*Presenter*) Research Consultant, Bristol-Myers Squibb Company Research Consultant, Eli Lilly and Company Research Consultant, Neuronetrix, Inc Research Consultant, Medivation, Inc Research Grant, Bristol-Myers Squibb Company Research Grant, Eli Lilly and Company Research Grant, Neuronetrix, Inc Research Grant, Medivation, Inc Stockholder, Sonexa Therapeutics, Inc Stockholder, Clarimedix, Inc Speaker, Forest Medical, LLC

LEARNING OBJECTIVES

View learning objectives under main course title.

RC312

Vascular Series: MR Angiography: New Techniques and Their Application

Tuesday, Dec. 1 8:30AM - 12:00PM Location: S102AB

VA MR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Dominik Fleischmann, MD, Palo Alto, CA (*Moderator*) Research support, Siemens AG;

Sub-Events

RC312-01 Non-contrast MRA Techniques

Tuesday, Dec. 1 8:30AM - 8:55AM Location: S102AB

Participants
Scott B. Reeder, MD, PhD, Madison, WI (*Presenter*) Institutional research support, General Electric Company Institutional research support, Bracco Group

RC312-02 Depiction of Transplant Renal Vascular Anatomy and Complications: Unenhanced MR Angiography by Using Spatial Labeling with Multiple Inversion Pulses

Tuesday, Dec. 1 8:55AM - 9:05AM Location: S102AB

Participants
Hao Tang, Wuhan, China (*Presenter*) Nothing to Disclose

PURPOSE

To evaluate the ability to depict anatomy and complications of renal vascular transplant with unenhanced magnetic resonance (MR) angiography with spatial labeling with multiple inversion pulses (SLEEK) and to compare the results with color Doppler (CD) ultrasonography (US), digital subtraction angiography (DSA), and intraoperative findings.

METHOD AND MATERIALS

This study was approved by the institutional review board, and written informed consent was received before examination. Seventy-five patients who underwent renal transplantation were examined with unenhanced MR angiography with SLEEK and CD US. DSA was performed in 15 patients. Surgery was performed in eight patients. The ability of SLEEK to show transplant renal vascular anatomy and complications was evaluated by two experienced radiologists who compared the results with CD US, DSA, and intraoperative findings.

RESULTS

Patients successfully underwent SLEEK MR angiography. Transplant renal vascular anatomy was assessed in 87 arteries and 78 veins. Renal vascular complications from transplantation were diagnosed in 23 patients, which included 14 with arterial stenosis, three with arterial kinking, two with arteriovenous fistulas, two with venous stenosis, one with pseudoaneurysms, and one with fibromuscular dysplasia. Three patients had two renal transplants and nine patients had nine accessory renal arteries. More accessory renal arteries were detected with SLEEK than with CD US. Correlation was excellent between the stenosis degree with SLEEK and DSA (r= 0.96; P ,.05). For those with significant artery stenosis (.50% narrowing) proved with DSA (n= 7) or surgery (n= 3), positive predictive value was 91% (10 of 11).

CONCLUSION

Unenhanced MR angiography with SLEEK preliminarily proved to be a reliable diagnostic method for depiction of anatomy and complications of renal vascular transplant. It may be used for evaluation of patients with renal transplant, and in particular for those with renal insufficiency.

CLINICAL RELEVANCE/APPLICATION

Unenhanced MR angiography with SLEEK may be used for evaluation of patients with renal transplant, and in particular for those with renal insufficiency.

RC312-03 Nonenhanced ECG-gated Quiescent-interval Single Shot (QISS) MRA of the Lower Extremity for Planning of Interventional Procedures: Results in 43 PAD Patients

Tuesday, Dec. 1 9:05AM - 9:15AM Location: S102AB

Awards
RSNA Country Presents Travel Award

Participants
Peter Liersch, Duesseldorf, Germany (*Presenter*) Nothing to Disclose
Patric Kroepil, MD, Duesseldorf, Germany (*Abstract Co-Author*) Nothing to Disclose
Christoph K. Thomas, MD, Dusseldorf, Germany (*Abstract Co-Author*) Speaker, Siemens AG
Joel Aissa, Duesseldorf, Germany (*Abstract Co-Author*) Nothing to Disclose
Gerald Antoch, MD, Duesseldorf, Germany (*Abstract Co-Author*) Nothing to Disclose
Rotem S. Lanzman, MD, Duesseldorf, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the clinical value of nonenhanced ECG-gated Quiescent-Interval Single-Shot MR angiography (QISS-MRA) for planning of interventional procedures in patients with peripheral artery disease (PAD).

METHOD AND MATERIALS

43 patients (mean age 68.5 ± 10.8 years) with peripheral artery disease were included in this study. Nonenhanced QISS-MRA of the distal aorta and the lower extremity were acquired at 1.5T with 3mm slice thickness, with 0.6 mm overlap and an inplane resolution of 1.0 x 1.0 mm, resulting in a total scan time of approx. 9 min. ECG-gating was applied for synchronization of the quiescent interval with the period of maximum systolic inflow. The degree of stenosis was assessed by using a 4-point scale (grade 1, normal appearing vessel; grade 2, vessel narrowing < 50%; grade 3, stenosis 50%-99%; grade 4, vessel occlusion) for 15 predefined anatomical segments. QISS-MRA was used to plan interventional procedures. Interventional digital subtraction angiography (DSA) served as the reference standard.

RESULTS

QISS-MRA was performed successfully in all patients. 434 of 645 segments visible on QISS-MRA were evaluated with DSA during interventional procedures and were considered for further analysis. With QISS-MRA the degree of stenosis was assessed correctly in 404 of 434 (93.1%) segments, overestimated in 26 of 434 (5.9%) segments and underestimated in 4 of 434 (0.9%) segments. As compared to DSA, QISS-MRA had a high sensitivity (99.3%), specificity (97.2%) as well as positive and negative predictive value (89.3% and 97.3%) for the detection of significant stenosis (grade 3 and 4). Based on QISS-MRA, an appropriate arterial access was selected in all patients and the estimated length of stenosis or vessel occlusion was assessed correctly. 6 of 6 (100%) stented segments were not assessable.

CONCLUSION

ECG-gated QISS-MRA is a solid nonenhanced imaging technique for assessment of stenosis of the lower extremities and provides a reliable basis for interventional procedures. A limitation of QISS-MRA is the evaluation of stented segments.

CLINICAL RELEVANCE/APPLICATION

QISS-MRA is a reliable and precise nonenhanced imaging technique for assessment of peripheral arterial disease and can be applied safely in patients with contraindications for contrast material.

RC312-04 Qualitative and Quantitative Image Quality of Lower Extremity Angiography Using Non-Contrast-Enhanced Quiescent Interval Single-Shot (QISS) MRA: Comparison with CTA

Tuesday, Dec. 1 9:15AM - 9:25AM Location: S102AB

Participants
Akos Varga-Szemes, MD, PhD, Charleston, SC (*Presenter*) Nothing to Disclose
Giuseppe Muscogiuri, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Carlo N. De Cecco, MD,PhD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Pal Suranyi, MD, PhD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Julian L. Wichmann, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
U. Joseph Schoepf, MD, Charleston, SC (*Abstract Co-Author*) Research Grant, Bracco Group; Research Grant, Bayer AG; Research Grant, General Electric Company; Research Grant, Siemens AG; Research support, Bayer AG; ; ;
Stefanie Mangold, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Paola Maria Cannao, MD, San Donato Milanese, Italy (*Abstract Co-Author*) Nothing to Disclose
Shivraman Giri, PhD, Chicago, IL (*Abstract Co-Author*) Employee, Siemens AG
Thomas M. Todoran, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the qualitative and quantitative image quality of non-contrast quiescent interval single-shot (QISS) MRA in patients with peripheral artery disease (PAD).

METHOD AND MATERIALS

Twenty patients (67±6 years, 11 male) with PAD referred for a clinically indicated lower extremity CTA were consented for a non-contrast enhanced lower extremity MRA on a 1.5 clinical scanner (MAGNETOM Avanto, Siemens AG, Erlangen, Germany) using an investigational prototype QISS sequence (FOV 400x260mm2, TR/TE 3.5/1.4ms, flip angle 90°, acquisition length 144mm). Contrast to noise ratio (CNR) based on the vascular and peri-vascular signal was measured according to an 18-segment model. The segmental vascular enhancement and the image noise were rated on five-point scales (1-poor/non-diagnostic, 5-excellent) by two readers. Additionally, the number of non-diagnostic segments were counted and compared between CTA and QISS-MRA.

RESULTS

A total of 360 segments were evaluated. The average CNR measured in QISS-MRA images was 63.4±17.5. QISS-MRA vascular enhancement ratings by the two readers were 3.7±0.5 and 3.8±0.4, respectively, while the CTA readings were 4.0±0.4 and 4.1±0.5, respectively, resulting in no significant difference between the two modalities. QISS-MRA image noise ratings were 3.4±0.7 and 3.6±0.5, respectively, while those for CTA were 4.0±0.5 and 4.2±0.5, respectively. Excellent inter-reader agreement was found in image quality ratings (κ>0.8). Thirty-one segments (8.6%) were excluded from the CTA analysis due to stent artifacts (11), total occlusion (14), or heavy calcification (6) and 26 segments (7.2%) were non-diagnostic at MRA due to major image artifacts (12) or total occlusion (14). Five out of the six heavily calcified segments were diagnostic at QISS MRA.

CONCLUSION

In this study, image quality of non-contrast QISS-MRA was comparable to that of contrast enhanced CTA. In certain circumstances, such as in heavily calcified segments, QISS-MRA provides superior lumen visibility compared to CTA. Such a non-contrast technique may have potential advantage in patients with severe renal disease or with other risk factors that prohibit the use of iodinated or gadolinium-based contrast material.

CLINICAL RELEVANCE/APPLICATION

QISS-MRA enables non-contrast evaluation of the lower extremity arteries with comparable image quality to CTA, and is potentially

beneficial for patients with severe renal disease.

RC312-05 Role of Preoperative Dynamic Time Resolved MRA (DTR MRA) for Detection and Localization of Perforators in Patients Undergoing Free Fibula Flap (FFF) for Head and Neck Reconstruction

Tuesday, Dec. 1 9:25AM - 9:35AM Location: S102AB

Participants
Manohar Kuruva, MBBS, MD, Little Rock, AR (*Presenter*) Nothing to Disclose
Mauricio A. Moreno, MD, Little Rock, AR (*Abstract Co-Author*) Nothing to Disclose
Tarun Pandey, MD, FRCR, Little Rock, AR (*Abstract Co-Author*) Nothing to Disclose
Roopa Ram, MD, Little Rock, AR (*Abstract Co-Author*) Nothing to Disclose
Kedar Jambhekar, MD, Little Rock, AR (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

This study aimed at evaluating the accuracy of preoperative DTR MRA for the detection and localization of lower extremity septo-cutaneous perforators in patients undergoing free fibula flap (FFF) for head and neck reconstruction.

METHOD AND MATERIALS

Retrospective chart review of 43 patients who underwent pre-operative DTR MRA prior to FFF in a tertiary academic setting from 2009-2015. DTR MRA scans were evaluated for presence of perforators and their location relative to fibular head, and subsequently correlated with intra-operative findings. We considered location of perforator to be in concordance if the vessel was within 3cms based on DTR MRA and surgical findings, and hypothesized that differences within this range could represent distal perforator branches presenting radiologically as separate vessels.

RESULTS

DTR MRA and surgery identified at least one perforator in 42/43, and 41/43 patients respectively. The technique appropriately detected the presence of perforators in 40/41 patients and ruled out perforators in 1/2 patients, yielding a sensitivity, specificity and accuracy of 97.5%, 50% and 95.3%. Collectively, DTR-MRA accurately predicted the location of the perforators in 75% of the cases (48/64). On a patient-based analysis, DTR MRA correctly predicted the location of at least one perforator in 37/41 patients yielding an accuracy of 90% for this purpose.

CONCLUSION

DTR MRA accurately predicts the presence and location of cutaneous perforators in patients undergoing FFF reconstruction.

CLINICAL RELEVANCE/APPLICATION

To our knowledge, this is one of the largest study validating the role of MRA for this purpose. Preoperative localization of the vessels significantly impacts surgical planning and may prevent unnecessary surgical explorations in a percentage of patients.

RC312-06 One-stop-shop Preoperative Evaluation for Living Liver Donors with Gd-EOB-DTPA-enhanced MRI: Can it be More Cost-effective and Convenient?

Tuesday, Dec. 1 9:35AM - 9:45AM Location: S102AB

Participants
Shuangshuang Xie, Tianjin, China (*Presenter*) Nothing to Disclose
Wen Shen, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Chenhao Liu SR, PhD,PhD, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Tao Ren, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Lihua Chen, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Lixiang Huang, MD, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Yue Cheng, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Qian Ji, PhD, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose
Jianzhong Yin, MD, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare the efficacy, cost-effectiveness and convenience between one-stop-shop gadoxetic-acid-disodium (Gd-EOB-DTPA)-enhanced MR imaging (MRI) and multi-detector CT combined with conventional magnetic resonance cholangiopancreatography (MDCT-MRCP) in preoperative evaluation for living liver donors.

METHOD AND MATERIALS

Eighty living liver donors were included in this prospective study. They were randomly grouped in Gd-EOB-DTPA-enhanced MRI group (n=40) and MDCT-MRCP group (n=40). Anatomical variations determined by pre- and intra-operative findings, costs, and time for preoperative images were recorded. Image quality for the depiction of hepatic vessels, bile ducts and graft volume were ranked on a 4-point scale and compared between both groups.

RESULTS

Gd-EOB-DTPA-enhanced MRI provided better image quality than MDCT-MRCP for the depiction of hepatic and portal veins, and graft volume by both reviewers ($P<0.01$), and for the depiction of bile ducts by one reviewer ($P<0.01$). MDCT provided better image quality than Gd-EOB-DTPA-enhanced MRI for the depiction of hepatic arteries by both reviewers ($P<0.01$). Fifty nine living donors proceeded to liver donation (n=21 for Gd-EOB-DTPA-enhanced MRI group and n=38 for MDCT-MRCP group) with all anatomical findings of hepatic vessels and bile ducts accurately confirmed by intraoperative findings ($P>0.05$). The repeatability for graft volume measurements on Gd-EOB-DTPA-enhanced MRI was higher than MDCT-MRCP. Gd-EOB-DTPA-enhanced MRI was cheaper than MDCT-MRCP (US$519.72 vs US$631.85). The effective "in room" time in the Gd-EOB-DTPA-enhanced MRI was 3 minutes longer than MDCT-MRCP (25±5 min vs 28±6 min, $P<0.05$).

CONCLUSION

One-stop-shop Gd-EOB-DTPA-enhanced MRI is a more cost-effective and convenient modality with the similar diagnostic accuracy

One-stop-shop Gd-EOB-DTPA-enhanced MRI is a more cost-effective and convenient modality with the similar diagnostic accuracy as MDCT-MRCP in preoperative evaluation.

CLINICAL RELEVANCE/APPLICATION

Gd-EOB-DTPA-enhanced MRI is equal to MDCT-MRCP in preoperative evaluation of hepatic vessels, bile ducts and graft volume and is more cost-effective and convenient for living donors.

RC312-07 Contrast Enhanced MRA with Gadolinium and Ferumoxytol

Tuesday, Dec. 1 9:45AM - 10:10AM Location: S102AB

Participants
J. Paul Finn, MD, Los Angeles, CA (*Presenter*) Research Grant, Bracco Group; ; ;

LEARNING OBJECTIVES

1) Be familiar with the major clinical applications of Contrast Enhanced MRA using Gadolinium Agents and Ferumoxytol. 2) Be aware of the relative advantages and disadvantages of Gadolinium agents and Ferumoxytol for CEMRA in various clinical scenarios. 3) Be familiar with differences in techniques and acquisition protocols for CEMRA using Gadolinium agents and Ferumoxytol.

ABSTRACT

Contrast enhanced MR angiography (CEMRA) with gadolinium based contrast agents (GBCA) is well established as a reliable clinical tool for a variety of applications. Within the past decade, concerns about the risk of nephrogenic systemic fibrosis (NSF) has impacted the utilization of CEMRA and has stimulated the search for safer GBCA and alternatives to gadolinium agents. High stability and high relaxivity GBCA are now recommended for CEMRA to minimize risk of NSF in patients with renal failure, and dose reduction strategies have become standard. Also, early results with non-gadolinium CEMRA, specifically with ferumoxytol, are becoming available and suggest that in many cases, ferumoxytol may be a powerful alternative to GBCA for CEMRA. In this talk, we will review techniques and applications for CEMRA both with GBCA and ferumoxytol in adults and children over a spectrum of disease states.

RC312-08 Principles and Applications of 4D-flow

Tuesday, Dec. 1 10:20AM - 10:45AM Location: S102AB

Participants
James C. Carr, MD, Chicago, IL (*Presenter*) Research Grant, Astellas Group Research support, Siemens AG Speaker, Siemens AG Advisory Board, Guerbet SA

RC312-09 4D Flow can Depict and Quantify the Reflected Flow in the Lower Abdominal Aorta in Patients with Arteriosclerosis

Tuesday, Dec. 1 10:45AM - 10:55AM Location: S102AB

Participants
Masataka Sugiyama, Hamamatsu-Shi, Japan (*Presenter*) Nothing to Disclose
Yasuo Takehara, MD, Hamamatsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Naoki Ooishi, Hamamatsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Marcus T. Alley, PhD, Stanford, CA (*Abstract Co-Author*) Research Funding, General Electric Company; Research Consultant, Arterys;
Tetsuya Wakayama, PhD, Hino-shi, Japan (*Abstract Co-Author*) Employee, General Electric Company
Atsushi Nozaki, Hino, Japan (*Abstract Co-Author*) Employee, General Electric Company
Hiroyuki Kabasawa, Bunkyo, Japan (*Abstract Co-Author*) Employee, General Electric Company
Shuhei Yamashita, MD, Hamamatsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Hatsuko Nasu, Hamamatsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Harumi Sakahara, MD, Hamamatsu, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Majorities of physiological evidences indicate that the increase of Oscillatory Shear Index (OSI) produces an expression of pro-atherogenic genes. In patients with arteriosclerosis, reflected flow appears within the lower abdominal aorta during early diastolic phase. 3D cine PC MRI (4D-Flow) has enabled the coverage of full spatial and cardiac phase resolved data of the velocity vectors of the flowing blood within the whole abdominal aorta, thereby allow OSI mapping and flow volume analysis. The purpose of our study was to test if 4D Flow can depict reflected flow in the lower abdominal aorta, to quantitate the retrograde flow volume, and to verify their association with atherosclerosis, in the non-dilated lower abdominal aorta.

METHOD AND MATERIALS

37 patients (30 to 84 y.o.) underwent 3.0T MR study including 4D-Flow and Gd-3D MRA. The wall shear stress (WSS), the OSI, and aortic flow volume were measured for abdominal aorta. The ratio of retrograde to antegrade flow (R/A ratio) volume was calculated. Two experienced radiologists rated the presence of atherosclerosis in three grades in terms of the presence of the intimal lipidemic deposits with CT. Multiple regression analysis with explanatory variables of age, sex, systolic and diastolic blood pressure, diameters, systolic and diastolic WSS, OSI, maximum progressive and retrograde flow volume, and the R/A ratio was performed. The response variable was CT determinations of atheroma in the lower abdominal aorta.

RESULTS

Among flow dynamic parameters R/A ratio (p=0.019), and OSI (p=0.0364) were the determinant factors for the presence of atheroma. Prominent back flow collided with antegrade flow was also visually observed at early diastole in atherosclerotic patients and was considered to have induced instable shear stress directions, which resulted in higher OSI. The prominent retrograde flow represents reflected flow from the iliac arteries, which may be due to the lack of compliance of the atherosclerotic aorta and peripheral arteries.

CONCLUSION

4Dflow can depict and quantify the prominent retrograde flow during early diastole, which is closely related to the presence of

atheroma in the lower abdominal aorta.

CLINICAL RELEVANCE/APPLICATION

4DFlow could be an indicator of a loss of arterial volumetric compliance and increased OSI in the lower abdominal aorta, which might be the initiation factors of atherosclerotic degradation that leads to various fatal aortic diseases.

RC312-10 Assessment of Wall Shear Stress in Patients without Aortic Disease, with Aortic Aneurysms and with Penetrating Aortic Ulcers using Velocity Encoding 4D MRI

Tuesday, Dec. 1 10:55AM - 11:05AM Location: S102AB

Participants
Michael Rasper, Munich, Germany (*Presenter*) Nothing to Disclose
Jan Rudolph, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Christian Maegerlein, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Bettina M. Gramer, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Marcus Settles, PhD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Christian Reeps, MD, Muenchen, Germany (*Abstract Co-Author*) Nothing to Disclose
Hans-Henning Eckstein, MD, Muenchen, Germany (*Abstract Co-Author*) Nothing to Disclose
Ernst J. Rummeny, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Armin M. Huber, MD, Munchen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine whether patients with aortic aneurysms and penetrating aortic ulcers have an increased or reduced peak average wall shear stress magnitude compared to patients without aortic disease.

METHOD AND MATERIALS

26 patients (10 patients without aortic disease, 8 patients with aortic aneurysms (AA) and 8 patients with penetrating aortic ulcers (PAU)) underwent velocity encoded time resolved 3D MRI (4D PC MRI) of the aorta after contrast material (0.15 mmol/kg gadobenate dimeglumine) application during high resolution contrast-enhanced MR angiography of the aorta. 4D PC MRI was performed using ECG Gating and navigator echo based respiratory gating. Data acquisition was accelerated by SENSE in two directions (AF 1.5 x 2.5). The spatial resolution was 1.5 x 1.5 x 1.5 mm3. The temporal resolution was 40 ms. The peak velocity and the peak average wall shear stress magnitude were determined using the software GT-Flow (Version 2.0.10, Gyrotools, Switzerland).

RESULTS

The peak velocity was 71.6 ± 6.8 cm/s in patients without aortic disease, 35.6 cm/s ± 3.2 cm/s in patients with penetrating aortic ulcer and 18.2 ± 2.7 cm/s in patients with aortic aneurysms. The peak average wall shear stress magnitude was 0.35 ± 0.09 N/m2 in patients without aortic disease, 0.13 ± 0.004 N/m2 in patients PAU and 0.07 ± 0.018 N/m2 in AA patients. Both patients with aortic ulcera and patients with aortic aneurysms showed lower mean values for peak velocity ($p < 0.001$ and $p< 0.00001$) and peak average wall shear stress magnitude ($p < 0.01$ and $p < 0.004$) compared to patients without aortic disease. Patients with AA had significantly lower wall shear stress magnitude values than PAU patients.

CONCLUSION

Compared to patients without aortic disease, peak velocity and wall shear stress were significantly reduced in patients with penetrating aortic ulcers and patients with aortic aneurysms.

CLINICAL RELEVANCE/APPLICATION

Aortic segmental wall shear stress and flow velocity can reliably be determined with velocity encoded 4D MRI. Reduced wall shear stress is associated with aneurysma growth and might therefore help to identify patients at risk.

RC312-11 A Speeding Ticket for Perfusion MRI? Acceleration Techniques and Their Effect on Arterial Input Function Sampling: Non-accelerated versus View-sharing and Compressed Sensing Sequences

Tuesday, Dec. 1 11:05AM - 11:15AM Location: S102AB

Participants
Matthias Benz, MD, Basel, Switzerland (*Presenter*) Nothing to Disclose
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Tobias Heye, MD, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Initiatives such as the Quantitative Imaging Biomarkers Alliance and the American College of Radiology Imaging Network seek to identify sources of variation that may contribute to the overall measurement error in dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI). The aim of this study was to determine the ability of various DCE-MRI sequences to image the arterial input function (AIF) of an arterial bolus in comparison to a reference standard in a flow-phantom.

METHOD AND MATERIALS

The dynamic flow-phantom consists of three input ports representing the venous backflow and three mixing chambers simulating the cardiopulmonary circulation with 4L/min. A 25 mm diameter cylindrical outflow representing the aorta, a water- and a muscle-phantom were scanned on a 3T MRI (Magnetom Prisma, Siemens Healthcare, Erlangen, Germany) using fast low angle shot 2d (Fl2d; temporal resolution [tr] 0.6s; reference standard) and 3d (Fl3d; tr 2.4s [P2=parallel imaging factor 2] and 3.9s), time-resolved imaging with stochastic trajectories (TWIST; tr 2.2s), and golden-angle radial sparse parallel imaging (GRASP, tr 1.1s) GRE sequences. Each acquisition with administration of 10 ml contrast agent (Dotarem, Guerbet) via a power injector (2ml/s flow rate)

was repeated three times. Essential sequence parameters were standardized: flip angle 15°; spatial resolution 2.3x2.3x3mm3. Signal over time curves were normalized and analyzed by full width half maximum (FWHM) measurements to asses within sequence (coefficient of variation [COV]) and between sequence variations (percentage difference).

RESULTS

Water and muscle signal COV ranged from 0.1-0.8%. Within sequence FWHM COV was 1.0% for Fl3d, 1.0% for Fl3dP2, 9.1% for TWIST and 0.3% for GRASP. Percentage difference FWHM in comparison to Fl2d as reference standard was 2.2% for Fl3d, 0.3% for Fl3dP2, 45.9% for TWIST, and 7.8% for GRASP.

CONCLUSION

MRI acceleration techniques vary in reproducibility and sampling of arterial input function. Incomplete coverage of the k-space with TWIST as representative of view-sharing techniques demonstrates incoherent data over time and thus limitations in the evaluation of AIF.

CLINICAL RELEVANCE/APPLICATION

In order to establish DCE-MRI as a reproducible quantitative imaging biomarker it is necessary to assess how various forms of accelerated sequences handle the dynamic signal over time.

RC312-12 Clinical Impact of MRA in Site Selection in Patients Undergoing Free Fibular Flap Transfer (FFF)

Tuesday, Dec. 1 11:15AM - 11:25AM Location: S102AB

Participants
Manohar Kuruva, MBBS, MD, Little Rock, AR (*Presenter*) Nothing to Disclose
Roopa Ram, MD, Little Rock, AR (*Abstract Co-Author*) Nothing to Disclose
Kedar Jambhekar, MD, Little Rock, AR (*Abstract Co-Author*) Nothing to Disclose
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Tarun Pandey, MD, FRCR, Little Rock, AR (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the role and clinical impact of Dynamic Time-Resolved Magnetic Resonance Angiography (DTR MRA) for selecting the site for free fibula flap (FFF) harvest.

METHOD AND MATERIALS

A retrospective review of medical records of 69 patients who underwent pre-operative lower extremity DTR MRA prior to head and neck reconstructive surgery was done. Clinical findings were compared with MRA in determining the appropriate site of graft harvest.

RESULTS

DTR MRA identified vascular abnormalities, which led to change in management plan in 18/67 (27%) patients. Clinical findings were abnormal only in 4/18 (22%) of these patients. The two most common abnormalities included atherosclerotic narrowing (12 patients) and anatomical variations (4 patients). DTR MRA had significantly higher sensitivity to detect vascular abnormalities with implications in management than clinical examination alone (p=0.002). Addition of venous phase of imaging led to clinically occult venous pathologies in 4 patients, including deep venous thrombosis (2), varicose veins (1) and arteriovenous malformation/fistula (1).

CONCLUSION

Preoperative DTR MRA detected significant vascular abnormalities in patients undergoing FFF for head and neck reconstructive surgeries when compared to clinical examination,with a change in management in 28% of patients..

CLINICAL RELEVANCE/APPLICATION

DTR MRA prior to FFF can identify vascular pathology and anatomic variations and can potentially reduce the rate of complications and morbidity post fibular transfer for head and neck reconstructive surgeries.

RC312-13 Contrast-enhanced T1 Free-breathing Gradient Echo Sequences in the Assessment of Aortic Disease: Diagnostic Efficacy in Comparison with Standard T1 Breath-hold Gradient Echo Sequences

Tuesday, Dec. 1 11:25AM - 11:35AM Location: S102AB

Participants
Cammillo R. Talei Franzesi, Milan, Italy (*Presenter*) Nothing to Disclose
Davide Ippolito, MD, Monza, Italy (*Abstract Co-Author*) Nothing to Disclose
Pietro A. Bonaffini, MD, Monza, Italy (*Abstract Co-Author*) Nothing to Disclose
Davide Fior, MD, Monza, Italy (*Abstract Co-Author*) Nothing to Disclose
Giulia Querques, MD, Monza, Italy (*Abstract Co-Author*) Nothing to Disclose
Sandro Sironi, MD, Monza, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the diagnostic accuracy of contrast-enhanced T1 free-breathing gradient echo sequences in comparison with standard MR-angiographic sequences in the evaluation of aortic disease.

METHOD AND MATERIALS

From January 2012 to January 2015, 57 patients (35 men; mean age 62.1 years) with aortic disease were evaluated. All patients were examined with a 1.5T magnet (Achieva, Philips), using a phased array multi-coil, after the intravenous injection of 0.1 mL*Kg of gadobutrol. The standard thoracoabdominal MR angiography (MRA) protocol included 3D-angiographic T1 gradient-echo fat-suppressed (3D-HR) sequences and T1 breath-hold gradient-echo fat-suppressed sequences (THRIVE). Multiplanar T1 free-breathing gradient-echo fat-suppressed (THRIVE-FB) sequences were additionally performed in all the examinations. Two

radiologists independently compared the diagnostic quality of the different angiographic sequences, in terms of visualization of aortic wall and lumen and main arterial branches. The vascular calipers at different aortic levels were calculated, compared and statistically analyzed among the different sequences. The interobserver agreement was then evaluated using the Intraclass Correlation Coefficient (ICC).

RESULTS

THRIVE-FB sequences showed high diagnostic accuracy in the assessment of vascular calipers and walls, with no significant differences in comparison with standard breath-hold sequences. They also demonstrated high sensitivity and specificity in the evaluation of vascular plaques, thrombus and adjacent structures. Not significant differences were obtained in terms of overall diagnostic quality between THRIVE-FB sequences and standard angiographic sequences (interobserver agreement ICC of 0.97).

CONCLUSION

Contrast-enhanced T1 free-breathing gradient-echo fat-suppressed sequences have shown higher diagnostic efficacy, with any significant differences, in comparison with standard breath-hold angiographic sequences, permitting to correctly visualize and evaluate the aorta and its major branches.

CLINICAL RELEVANCE/APPLICATION

Free-breathing angiographic protocol represents a useful tool, even in not-compliant patients, offering high diagnostic quality images, able to correctly evaluate thoracic and abdominal arteries.

RC312-14 Role of MR in Cardiovascular Disease Research

Tuesday, Dec. 1 11:35AM - 12:00PM Location: S102AB

Participants
Tim Leiner, MD, PhD, Utrecht, Netherlands, (t.leiner@umcutrecht.nl) (*Presenter*) Speakers Bureau, Koninklijke Philips NV; Research Grant, Bayer AG; Research Grant, Bracco Group

LEARNING OBJECTIVES

1) To identify how MRI can contribute to understanding the pathophysiology of non-cardiac vascular disease and to describe its merits and shortcomings in relation to other commonly used imaging modalities. 2) To describe different MR methods that can be used to study vascular disease such as vessel wall imaging, atherosclerotic plaque imaging and measurement of pulse wave velocity. 3) To explain which of the above MR methods can be used clinically, and which methods are primarily experimental.

RC313

Pediatric Series: CV/Chest

Tuesday, Dec. 1 8:30AM - 12:00PM Location: E353A

CH VA CT MR PD

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.50

FDA Discussions may include off-label uses.

Participants
Shreyas S. Vasanawala, MD, PhD, Palo Alto, CA (*Moderator*) Research collaboration, General Electric Company; Consultant, Arterys; Research Grant, Bayer AG;
Lorna Browne, MD, FRCR, Denver, CO (*Moderator*) Nothing to Disclose
Rajesh Krishnamurthy, MD, Houston, TX (*Moderator*) Research support, Koninklijke Philips NV; Research support, Toshiba Corporation
R. Paul Guillerman, MD, Houston, TX (*Moderator*) Nothing to Disclose

Sub-Events

RC313-01 Imaging of Aortopathies

Tuesday, Dec. 1 8:30AM - 8:50AM Location: E353A

Participants
Cynthia K. Rigsby, MD, Chicago, IL, (crigsby@luriechildrens.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define aortopathy. 2) Describe the imaging features of common aortopathies. 3) Show potential complications associated with aortopathies.

RC313-02 4D flow MRI Based Volumetric Aortic Peak Velocity Quantification: Efficiency, Observer Variability and Comparison to 2D Phase Contrast MRI

Tuesday, Dec. 1 8:50AM - 9:00AM Location: E353A

Participants
Michael Rose, Chicago, IL (*Presenter*) Nothing to Disclose
Kelly Jarvis, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Varun Chowdhary, MD, BS, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Alex Barker, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Bradley D. Allen, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Joshua D. Robinson, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Michael Markl, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Susanne Schnell, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Cynthia K. Rigsby, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Standard methods for measuring peak blood flow velocity include Doppler echocardiography and 2D CINE phase contrast (PC) MRI. Due to their reliance on single-direction velocity encoding and regional flow analysis (2D planes) both methods can underestimate peak velocities, especially in cases of complex flow jets as commonly seen in patients with abnormal aortic valves. The aim of this study was to test the feasibility and efficiency of a new method for volumetric peak velocity quantification of aortic peak systolic blood flow velocities in a cohort of pediatric BAV patients using 4D flow MRI and velocity maximum intensity projections (MIPs).

METHOD AND MATERIALS

51 pediatric BAV patients (age = 14 ± 5, range = 3-24 years, 18 female) underwent aortic 4D flow MRI (1.5T Aera, Siemens, Germany). After pre-processing (velocity anti-aliasing, phase offset correction) and 3D segmentation of the aorta, velocity MIPs were generated to determine peak velocities in the ascending aorta, arch, and descending aorta by two independent observers. 4D flow derived peak velocities were compared to results from 2D CINE PCMRI from the same study for 36 BAV patients.

RESULTS

4D flow peak systolic velocities were significantly higher than 2D CINE PC MRI (2.02±0.72 m/s vs 1.72±0.81 m/s, p = 0.0001, Wilcoxon signed-rank test). Bland-Altman analysis of peak velocity assessment showed excellent inter-observer variability (mean difference = -0.005 m/s, limits of agreement = ± 0.192 m/s) with low average inter-observer error 2.0 %. The estimated time for 4D flow MRI pre-processing and segmentation was 20 min. Average analysis time (calculation of velocity MIP, ROI analysis) was 92 ± 49 s.

CONCLUSION

4D flow MRI in combination with 3D segmentation of the aorta and velocity MIP analysis can be used to determine aortic peak systolic velocity with high efficiency and low observer variability. The full volumetric coverage and 3-directional velocity of 4D flow MRI fully captures complex aortic flow patterns and is thus better suited to identify the highest velocity in an entire aortic segment compared to 2D CINE PC MRI, which underestimated peak velocities in our BAV cohort by 15%.

CLINICAL RELEVANCE/APPLICATION

In patients with aortic valve disease such as bicuspid aortic valve (BAV), the severity of valve disease is characterized using peak blood velocity to estimate the peak transvalvular pressure gradient (via the simplified Bernoulli equation).

RC313-03 Accuracy of Ventricular Septal Defect Measurements by High Pitch Computed Tomography Angiography of the Thorax in Pediatric Patients Younger Than One Year Compared to Echocardiographic and Intraoperative Measurements

Tuesday, Dec. 1 9:00AM - 9:10AM Location: E353A

Participants
Matthias S. May, Erlangen, Germany (*Presenter*) Speakers Bureau, Siemens AG
David Nau, Erlangen, Germany (*Abstract Co-Author*) Nothing to Disclose
Oliver Rompel, MD, Erlangen, Germany (*Abstract Co-Author*) Nothing to Disclose
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Michael M. Lell, MD, Erlangen, Germany (*Abstract Co-Author*) Research Grant, Siemens AG; Speakers Bureau, Siemens AG; Research Grant, Bayer AG ; Speakers Bureau, Bayer AG; Research Consultant, Bracco Group; ;
Wolfgang Wust, MD, Erlangen, Germany (*Abstract Co-Author*) Speakers Bureau, Siemens AG

PURPOSE

Preoperative assessment of VSDs is routinely performed by echocardiography. However, it seems to be challenging to obtain precise and reproducible findings, due to the limited angulations that are available. Additional preoperative evaluation by Computed Tomography (CT) has become reasonable in the recent years for complex congenital heart disease and allow for assessment of the size of VSDs in a static and isovolumetric dataset. Our aim was to evaluate the accuracy of size measurement of congenital ventricular septal defects (VSD) using High Pitch Computed Tomography Angiography of the thorax compared to echocardiography and intraoperative findings in children with congenital heart disease below 1 year.

METHOD AND MATERIALS

Angiography of the chest was performed using a second and third generation Dual-Source CT in 54 patients (median age 7 days, range 1-348 days) with a high-pitch protocol (p=3.2-3.4) at low tube voltages (70-80 kV). The margins of the VSDs were angulated by Multiplanar Reformations and Minimum Intensity Projection (MinIP) was used to overcome partial volume effects. The results were compared to the measurements from echocardiography and intraoperative measurements served as reference.

RESULTS

Mean deviation of the CT-measurements compared to the intraoperative findings was not statistically significant (3.5 ± 3.0 mm, p=0.21), while the mean difference compared to echocardiography was significantly higher (7.4 ± 4.8 mm, p<0.01). The VSDs can be classified into four different types by CT. With the exception of apical septal defects the size of the defects seems not to correlate with a specific location. Median radiation dose was as low as 0.37 mSv (range 0.12 - 2.00 mSv).

CONCLUSION

High Pitch Computed Tomography Angiography of the thorax provides precise measurements of VSDs in pediatric patients with congenital heart disease younger than one year.

CLINICAL RELEVANCE/APPLICATION

Preoperative High Pitch Computed Tomography Angiography of the thorax, besides the advantages in imaging of the coronaries and great intrathoracic vessels, provides precise measurements of VSDs at reasonable low radiation dose.

RC313-04 Image Quality and Accuracy of a Prototype Self-Navigated 3D Whole-heart Sequence for the Assessment of Coronary Artery Anomalies in a Pediatric Patient Population

Tuesday, Dec. 1 9:10AM - 9:20AM Location: E353A

Participants
Giuseppe Muscogiuri, MD, Charleston, SC (*Presenter*) Nothing to Disclose
Akos Varga-Szemes, MD, PhD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Carlo N. De Cecco, MD,PhD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Pal Suranyi, MD, PhD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Julian L. Wichmann, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
U. Joseph Schoepf, MD, Charleston, SC (*Abstract Co-Author*) Research Grant, Bracco Group; Research Grant, Bayer AG; Research Grant, General Electric Company; Research Grant, Siemens AG; Research support, Bayer AG; ; ;
Paola Maria Cannao, MD, San Donato Milanese, Italy (*Abstract Co-Author*) Nothing to Disclose
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Anthony M. Hlavacek, MD, Charleston, SC (*Abstract Co-Author*) Investigator, Siemens AG Research Grant, Siemens AG
Arni C. Nutting, MD, Charleston, SC (*Abstract Co-Author*) Research Grant, Siemens AG

PURPOSE

The aim of this study was to assess the feasibility, image quality, and diagnostic performance of a prototype non-contrast enhanced self-navigated 3D (SN3D) whole-heart MRA acquisition in comparison with coronary CT angiography (cCTA) for delineating the coronary artery origin and proximal course in pediatric patients with suspected coronary artery anomalies.

METHOD AND MATERIALS

Seven patients (13±3 years) with suspected coronary artery anomalies underwent a reference standard cCTA (SOMATOM Flash, Siemens Healthcare, Forchheim, Germany) and a research non-contrast cardiac MRA (MAGNETOM Avanto 1.5T, Siemens Healthcare, Erlangen, Germany) for the assessment of the origin and proximal course of the coronary arteries. The steady-state free precession based SN3D MRA was performed using the following parameters: TR/TE 3.1/1.5ms, flip angle 115°, FOV 220mm, voxel size: 1.1mm3, and 12064 radial views distributed over 377 heartbeats. Subjective image quality of the SN3D MRA and cCTA was evaluated using a 4-grade scale (1, nondiagnostic; 2, sufficient; 3, good; 4, excellent). Visualization of the left main, left anterior descending (LAD), circumflex (LCX) and right coronary arteries (RCA), as well as the time of acquisition and signal to noise

ratio (SNR), were assessed. Wilcoxon test was used to compare subjective image quality between cCTA and MRA.

RESULTS

The acquisition time of the SN3D MRA was 5.9±1.4min with an average heart rate of 81bpm, while the mean SNR was 27±9. MRA and cCTA image quality ratings were 2.3±0.7 and 3.3±0.7, respectively (p>0.05). SN3D MRA allowed the visualization of the left main, the LAD and the RCA with good agreement to cCTA in all cases, but failed to visualize the LCX in a single case.

CONCLUSION

In this preliminary study there was good agreement for the evaluation of coronary artery anatomy between SN3D MRA and cCTA. The novel radial SN3D sequence allows for the acquisition of an isotropic volume in a free-breathing fashion in about half the time as a standard respiratory-navigated coronary MRA, with an improved ease of use, without penalties in image quality, and without radiation exposure, contrast agent administration or the need for general anesthesia.

CLINICAL RELEVANCE/APPLICATION

This non-contrast self-navigated MRA sequence provides relatively rapid, free-breathing radiation-free evaluation of anomalies of the coronary artery origin and proximal course in children.

RC313-05 Contrast Material Injection via Fenestrated Catheters is Useful in Pediatric Patients with Congenital Heart Disease Undergoing CT Angiography

Tuesday, Dec. 1 9:20AM - 9:30AM Location: E353A

Participants
Takanori Masuda, Hiroshima, Japan (*Presenter*) Nothing to Disclose
Yoshinori Funama, PhD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Masao Kiguchi, RT, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Takayuki Oku, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
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Kazuo Awai, MD, Hiroshima, Japan (*Abstract Co-Author*) Research Grant, Toshiba Corporation; Research Grant, Hitachi, Ltd; Research Grant, Bayer AG; Reseach Grant, DAIICHI SANKYO Group; Medical Advisor, DAIICHI SANKYO Group; Research Grant, Eisai Co, Ltd; Research Grant, Nemoto-Kyourindo; ; ; ; ;
Tomoyasu Sato, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Noritaka Noda, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

While 3D CT angiography (CTA) images are useful for evaluating the complex anatomy in patients with congenital heart disease, they require higher contrast enhancement to identify blood vessels and soft tissues. However, the thin pediatric vessel wall imposes an injection pressure limit and can result in poor CT enhancement. As the gauge of the fenestrated- is smaller than of the conventional nonfenestrated catheter, optimal enhancement can be achieved by controlling the injection pressure. We compared the injection rate, aortic enhancement, and injection pressure when intravenous contrast material was injected with fenestrated- and conventional non-fenestrated catheters.

METHOD AND MATERIALS

We randomly divided 34 pediatric patients seen between December 2014 and March 2015 into two groups. Group A consisted of 18 children (age one week to 8 months, body weight 3.6 ± 1.2 kg) and group B of 16 (age one week to 12 months, body weight 3.3 ± 0.9 kg). In group A we delivered the contrast medium via a 22-gauge conventional non-fenestrated catheter and in group B we used a 24-gauge fenestrated catheter. Whole-heart helical CTA scans were performed on a 64-detector scanner (GE VCT, tube voltage 80 kVp, detector configuration 64 x 0.625 mm, rotation time 0.4s/r, helical pitch 1.375, preset AEC noise index 12) and the injection rate, aortic enhancement, and injection pressure were compared in groups A and B.

RESULTS

The mean injection rate and aortic enhancement were 0.9 ± 0.1 ml/sec and 468 ± 45.0 HU in group A and 0.87 ± 0.3 ml/sec and 444 ± 63.5 HU in group B. There was no significant difference in the injection rate and aortic enhancement ($p = 0.34$, $p = 0.38$). The maximum injection pressure was significantly lower in group B than group A (0.33 vs. 0.55 kg/cm2, $p < 0.05$).

CONCLUSION

Use of the fenestrated catheter decreases the injection pressure limit while retaining the injection rate and aortic enhancement of conventional catheters.

CLINICAL RELEVANCE/APPLICATION

With use of the fenestrated catheter, pediatric CT angiography obtains the optimal aortic enhancement by changing injection rate in safety.

RC313-06 The Impact of Dual-source Parallelradiofrequency Transmission with Patient-adaptive Shimming on the 3.0 T Cardiac Magnetic Resonance in Children

Tuesday, Dec. 1 9:30AM - 9:40AM Location: E353A

Participants
Haipeng Wang, Jinan, China (*Abstract Co-Author*) Nothing to Disclose
Cuiyan Wang, MD, PhD, Jinan, China (*Abstract Co-Author*) Nothing to Disclose
Fei Gao, Jinan, China (*Abstract Co-Author*) Nothing to Disclose
Bin Zhao, MD, Jinan, China (*Presenter*) Nothing to Disclose

PURPOSE

To evaluate the effect of dual-source parallel RF transmission on the B1 homogeneity, the image quality (image contrast and off-resonance artifacts) in the cine b-SSFP sequence and the repeatability of left-ventricle cardiac function in 3.0T CMR of children.

METHOD AND MATERIALS

The prospective intraindividual comparison study was approved by the institutional ethics committee and written informed consent was obtained. The 3.0T cardiac magnetic resonance (CMR) was performed in 30 chronic myocarditis children by using the dual-source radiofrequency (RF) transmission with patient-adaptive RF shimming. B1 homogeneity and image contrast with and without RF shimming were quantitatively evaluated and t-test was used for statistical significance. The off-resonance artifacts were evaluated independently by two readers. Statistical significance was assessed by the Mann-Whitney U test and inter-observer agreement by Cohen's kappa test. The inter-observer agreement of LV cardiac function with dual-source RF transmission was evaluated by Bland-Altman analysis and the intra-class correlation coefficient (ICC).

RESULTS

Compared with single-source RF transmission, dual-source RF transmission with patient-adaptive RF shimming performed a higher mean percentage of flip angle (FA), lower coefficient of variation (CV) and higher image contrast in both free-breathe (NBH) and breathe-hold (BH) scanning($P < 0.05$ for all). The scores of off-resonance artifacts with patient-adaptive RF shimming were lower than that without RF shimming ($P < 0.05$) and inter-observer agreement between two readers was good to very good (kappa values from 0.66 to 0.86). A high level inter-observer agreement for cardiac function with RF shimming was acquired both in NBH scanning (CV: 1.91%-11.84%; ICC, 0.83-0.98) and BH scanning (CV: 0.52%-4.44%; ICC, 0.98-0.99)

CONCLUSION

Dual-source parallel RF transmission with patient-adaptive RF shimming could significantly improve the B1 homogeneity and image contrast, reduce the off-resonance artifacts in the b-SSFP cine image and show excellent reproducibility of cardiac function in the 3.0T CMR of children.

CLINICAL RELEVANCE/APPLICATION

Dual-source parallel RF transmission could significantly improve the B1 homogeneity and image quality and is suitable for the 3.0T cardiac magnetic resonance in children.

RC313-07 Estimation of Functional Lung Capacity and Correlation with the Results of Infant Pulmonary Function Test and Quantitative CT Assessment in Infants with Postinfectious Bronchiolitis Obliterans

Tuesday, Dec. 1 9:40AM - 9:50AM Location: E353A

Participants
Mi-Jung Lee, MD, PhD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Yoon Hee Kim, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyun Joo Shin, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Myung-Joon Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Myung Hyun Sohn, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the possibility for estimating functional lung capacity from ventilation inhomogeneity using infant pulmonary function test (iPFT) and quantitative CT assessment for air trapping in infants with postinfectious bronchiolitis obliterans (BO).

METHOD AND MATERIALS

This prospective study included infants with clinically and radiologically proven BO since 2009. We performed iPFT in these patients and measured tidal volume (TV), functional residual capacity (FRC) and lung clearance index (LCI) by sulphur hexafluoride multiple breath washout using an ultrasonic flow meter. From chest CT, we calculated total lung volume (CT-TLV) and imaging functional lung volume (CT-FLV) which showed higher attenuation than the mean attenuation of the grossly normal and air trapping areas. We compared iPFT and CT parameters using Spearman correlation analysis.

RESULTS

Thirteen infants (M:F = 11:2) were included in this study. The age was 3-17 months with the mean of 10.4 ± 4.5 months. The mean body weight and height were 9.4 ± 1.7 kg and 75.9 ± 8.0 cm. The values of TV, FRC and LCI were 82.0 ± 19.9 ml, 184.1 ± 49.1 ml and 8.2 ± 1.3, respectively. For chest CT, the effective radiation dose was 0.2-1.8 mSv with the mean of 1.0 ± 0.5 mSv. The values of normal lung attenuation and air trapping attenuation on CT were -571.3 ± 63.1 HU and -767.1 ± 58.3 HU. And the calculated CT-TLV and CT-FLV were 268.8 ± 90.9 ml and 202.9 ± 70.4 ml. In the correlation analysis, CT-TLV had a positive correlation with TV ($\gamma = 0.602$, $p = 0.029$) and FRC ($\gamma = 0.731$, $p = 0.005$). CT-FLV also showed a significant negative correlation with LCI ($\gamma = -0.670$, $p = 0.012$) which represented ventilation inhomogeneity.

CONCLUSION

Both iPFT and chest CT can demonstrate ventilation inhomogeneity and estimate functional lung capacity in infants with postinfectious BO with good correlation. Both methods can be useful and complementary for evaluating in these patients.

CLINICAL RELEVANCE/APPLICATION

Not only infant pulmonary function test but also quantitative chest CT assessment can demonstrate ventilation inhomogeneity and estimate functional lung capacity in infants who are not easy to evaluate lung function due to limited compliance.

RC313-08 Coronary Artery Imaging in Children

Tuesday, Dec. 1 9:50AM - 10:10AM Location: E353A

Participants
Lorna Browne, MD, FRCR, Denver, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) How to successively image the coronary arteries in children with both MR and CT. 2) How to interpret a range of coronary artery anomalies and pathologies.

RC313-09 Dynamic Airway Imaging

Tuesday, Dec. 1 10:30AM - 10:50AM Location: E353A

Participants
Rajesh Krishnamurthy, MD, Houston, TX (*Presenter*) Research support, Koninklijke Philips NV; Research support, Toshiba Corporation

LEARNING OBJECTIVES

1) Discuss indications and protocols for dynamic airway imaging in children using CT and MRI, with emphasis on advantages offered by new generation CT scanners. 2) Learn appropriate use of common post-processing tools and measurement metrics for the pediatric airway that correlate well with bronchoscopy. 3) Understand imaging findings that distinguish between intrinsic and extrinsic airway pathology. 4) Review common applications for dynamic airway imaging, including tracheobronchomalacia, vascular mediated airway compromise, complete tracheal rings, mediastinal masses, and airway tumors.

ABSTRACT

This talk will provide an overview of indications and protocols for dynamic airway imaging in children using CT and MRI, with emphasis on advantages offered by new generation CT scanners, and post-processing tools that allow derivation of metrics similar to bronchoscopy, We will review examples of intrinsic and extrinsic airway pathology in children, including tracheobronchomalacia, vascular mediated airway compromise, complete tracheal rings, mediastinal masses, and airway tumors.

RC313-10 Comparison of a ROI-based and a Whole-lung Segmentation Based Approach for MR Lung Perfusion Quantification in Two-year Old Children after Congenital Diaphragmatic Hernia Repair

Tuesday, Dec. 1 10:50AM - 11:00AM Location: E353A

Participants
Meike Weidner, Mannheim, Germany (*Presenter*) Nothing to Disclose
Verena Sommer, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Frank G. Zoellner, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Claudia Hagelstein, MD, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Thomas Schaible, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Stefan O. Schoenberg, MD, PhD, Mannheim , Germany (*Abstract Co-Author*) Institutional research agreement, Siemens AG
Wolfgang Neff, MD, PhD, Alzey, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

By the means of a region-of-interest (ROI) based approach it has been demonstrated that 2-year old children after congenital diaphragmatic hernia (CDH) repair show reduced MR lung perfusion values on the ipsilateral side. As ROI-based approaches only cover parts of the lung tissue, this study aimed to evaluate if results can be reproduced by segmentation of whole lung, whether there are differences between both approaches and as a consequence which technique should be applied.

METHOD AND MATERIALS

DCE-MRI was performed in 30 children (24.3±1.8 month) after CDH repair using a 3D TWIST sequence (Siemens Healthcare, Germany). 0.05 mmol/kg body weight of contrast agent (Dotarem, Guerbet, France) were administered. Pulmonary blood flow (PBF) was calculated based on a pixel-by-pixel deconvolution approach. For ROI-based quantification, three circular ROIs (apical, middle and basal) per lung side were used both in the ventral and dorsal lung. Propagation of those circular ROIs through five adjacent sliced generated 6 cylindrical ROIs in the ventral and dorsal lung respectively. For whole-lung analysis, the whole lung was contoured. In both techniques larger vessels were excluded from analysis (Fig. A).

RESULTS

In the ROI-based approach, PBF was significantly reduced on the ipsilateral side (74.5±30.3 ml/100ml/min) in comparison to the contralateral side (113.1±40.4 ml/100ml/min; $p<0.0001$). Also in the whole-lung based approach ipsilateral PBF was significantly lower (73.9±25.5 ml/100ml/min) than in the contralateral lung (102.3±31.8 ml/100ml/min; $p<0.0001$). In the ipsilateral lungs, quantification results of the ROI-based and the whole-lung segmentation based approach were equal ($p=0.50$). In the contralateral lungs, the ROI-based approach significantly overestimated PBF in comparison to the whole-lung approach by approximately 9.5% ($p=0.0013$; Fig. B).

CONCLUSION

MR lung perfusion in 2-year children after CDH is significantly reduced ipsilaterally, both when quantified by a ROI-based and a whole-lung based approach. In the contralateral lung, the ROI-based approach significantly overestimates perfusion results and therefore whole lung segmentation should be preferred.

CLINICAL RELEVANCE/APPLICATION

With MR lung perfusion imaging, perfusion deficits after congenital diaphragmatic hernia can be depicted. Whole-lung segmentation for quantification is advisable, as a ROI-based approach can overestimate results.

RC313-11 Functional Lung MRI for Non-invasive Monitoring of Regional Effects of Inhaled Hypertonic Saline in Children with Cystic Fibrosis

Tuesday, Dec. 1 11:00AM - 11:10AM Location: E353A

Participants
Till F. Kaireit, Hannover, Germany (*Presenter*) Nothing to Disclose
Julius Renne, MD, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose
Christian O. Schoenfeld, MD, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose
Andreas Voskrebenzev, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose
Marcel Gutberlet, Dipl Phys, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose
Angela Schulz, Hanover, Germany (*Abstract Co-Author*) Nothing to Disclose
Gesine Hansen, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose

Tobias Welte, MD, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose
Frank K. Wacker, MD, Hannover, Germany (*Abstract Co-Author*) Research Grant, Siemens AG Research Grant, Pro Medicus Limited
Burkhard Tuemmler, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose
Jens Vogel-Claussen, MD, Hannover, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Quantification of regional effects of inhaled hypertonic saline (7% NaCl) by functional lung MRI in adolescents with cystic fibrosis (CF).

METHOD AND MATERIALS

The clinical effect of a single treatment with hypertonic saline inhalation in patients with CF is still under debate. 17 CF patients prospectively underwent two functional lung MRI scans and pulmonary function tests on the same day before and 1h after a single treatment of inhaled hypertonic saline (n=10, mean 15,2y, mean FEV1% 80±21) or without any treatment (n=7, mean 13,9y, mean FEV1% 80±20) at 1.5T. As a 2nd control group 12 healthy volunteers (mean 28,5y) were included. Assessed parameters for both cohorts were as follows: MRI-derived T1 relaxation measurements breathing room air (T1(21)) and 100% oxygen as well as the calculated oxygen transfer function (OTF), normalized fractional ventilation (FV) obtained by ventilation-weighted Fourier Decomposition MRI; pulmonary blood flow (PBF) obtained by dynamic contrast enhanced MRI, a morpho-functional CF-MRI score and the lung clearance index (LCI). After manual segmentation of each lobe mean and coefficient of variation (CoV) were calculated.

RESULTS

Comparing the CF group to healthy controls, mean values of T1(21) (1176ms vs. 1246 ms, $p < 0.01$) and FV (0.67 vs. 0.95, $p < 0.001$) were significantly lower and the CoV significantly higher (CoV T1(21) 0.08 vs. 0,04; CoV FV 0.73 vs. 0.37, $p < 0.001$ for all). In CF group receiving treatment, mean values in the whole lung of OTF (pre 13.1/post 12.7 10-4/s/%O2), FV (pre 0.69/post 0.76), PBF (pre 98/post 102ml/100 ml/min), LCI (pre 12.1/post 13.1) and the morpho-functional score (pre 15 / post 17) did not show a significant difference between pre and post treatment measurements ($p > 0.05$). Also data on a lobar level in the treatment group as well as measurements in the CF-control group did not show any significant differences between the 2 MRI exams ($p > 0.05$).

CONCLUSION

Compared to healthy controls functional lung MRI detects significantly increased ventilation heterogeneity in CF patients. After a single treatment with inhalation of hypertonic saline (7% NaCl) neither functional lung MRI nor LCI detected a significant change in CF patients.

CLINICAL RELEVANCE/APPLICATION

This study shows the feasibility of functional lung MRI, as a non-invasive, radiation-free tool for visualization and quantification of potential regional treatment effects in patients with CF.

RC313-12 Comparison of Lung Ultrasound and Chest Radiographyin Estimating Lung Edema after Surgery for Congenital Heart Disease in Children

Tuesday, Dec. 1 11:10AM - 11:20AM Location: E353A

Participants
Laura Martelius, Helsinki, Finland (*Presenter*) Nothing to Disclose
Anu Kaskinen, Helsinki, Finland (*Abstract Co-Author*) Nothing to Disclose
Kirsi Lauerma, MD, Helsinki, Finland (*Abstract Co-Author*) Nothing to Disclose
Paula Rautiainen, Helsinki, Finland (*Abstract Co-Author*) Nothing to Disclose
Sture Andersson, Helsinki, Finland (*Abstract Co-Author*) Nothing to Disclose
Olli Pitkanen, Helsinki, Finland (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Lung edema is a frequent complication after surgery for congenital heart disease in children. A readily available accurate measure for lung edema is lacking. Chest radiographs (CXR) are commonly used for this purpose. CXR, however, is inaccurate especially in intensive care when portable supine radiographs are used. In lung ultrasound (US) vertical artifacts known as B-lines have been shown to correlate with lung liquid. In adults with congestive heart disease B-lines in US correlates with lung edema scored from CXR. Our aim was to compare lung US and CXR in estimating lung edema in children after surgery for congenital heart disease.

METHOD AND MATERIALS

Lung US was performed on 50 children 1-6 h postoperatively using a high-frequency linear transducer. Videoclips from three anterolateral intercostal spaces on both sides were stored. An observer blinded to the patient data and CXR scored the abundance of B-lines on each videoclip using a 5-step scale (0 = no artefact, 1 = B-lines in <25% of surface area, 2 = <50%, 3 = <75%, and 4 = >75%). The postoperative CXR were evaluated for lung edema at the right and left upper and lower lobes, the middle lobe and lingula using a 4-step scale (0 = normal lung, 1 = minimal opacity, 2 = opacity partially obscuring lung vessels, 3 = opacity totally obscuring lung vessels). For each patient a mean score for lung US (B-line score), and for CXR (CXR LE score) was calculated.

RESULTS

There was a significant positive correlation between the B-line score and the CXR LE score ($R = 0.65$, $p < 0.001$).

CONCLUSION

Lung US is a promising diagnostic tool in evaluation of postoperative lung edema in patients with congenital heart disease.

CLINICAL RELEVANCE/APPLICATION

Lung US has great potential since the current methods for estimating lung edema are unsatisfactory (CXRs are nonspecific, invasive techniques are unreliable in patients with intracardiac shunts).

RC313-13 Computerized Texture Analysis of Pulmonary Nodules in Pediatric Osteosarcoma Patients:

Differentiation of Pulmonary Metastases from Non-metastatic Nodules

Tuesday, Dec. 1 11:20AM - 11:30AM Location: E353A

Participants
Yeon Jin Cho, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Young Hun Choi, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yoo Jin Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ji-Eun Park, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyun Suk Cho, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sang Joon Park, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jung-Eun Cheon, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Woo Sun Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
In-One Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the value of computerized 3D texture analysis for differentiation of pulmonary metastases from non-metastatic lesions in pediatric osteosarcoma patients.

METHOD AND MATERIALS

Our study comprised 42 pathologically confirmed pulmonary nodules in 16 children with osteosarcoma who had undergone preoperative CT scans between January 2009 and December 2014. Each pulmonary nodule was manually segmented and its computerized texture features were extracted by using an in-house software program. Multivariate logistic regression analysis was performed to investigate the differentiating factors of metastatic nodules from non-metastatic lesions. A subgroup analysis was performed to identify significant differentiating parameters in non-calcified pulmonary nodules. The ROC curve was created to evaluate the discriminating performance of established model.

RESULTS

There were 24 metastatic pulmonary nodules and 18 non-metastatic pulmonary lesions. Pulmonary metastases and non-metastatic lesions exhibited significant differences in various histograms and volumetric parameters (P< .05). Multivariate analysis revealed that higher mean Hounsfield units (HU) (adjusted odds ratio (OR), 1.02) and larger effective diameter (OR, 17.03) are significant differentiators (P< .05). The subgroup analysis with non-calcified pulmonary nodules (13 metastases and 18 non-metastases) revealed significant differences between metastases and non-metastases in various parameters. Multivariate logistic regression analysis revealed that lower entropy (OR, 0.01) and larger effective diameter (OR, 38.92) are significant predictors of non-calcified pulmonary metastases (P< .05). The established logistic regression model of subgroup showed excellent discriminating performance in ROC analysis (AUC, 0.927).

CONCLUSION

Metastatic pulmonary nodules from osteosarcoma can be accurately differentiated from non-metastatic pulmonary lesions by using computerized texture analysis. High HU and larger effective diameter were the significant predictors for pulmonary metastases, while lower entropy and larger effective diameter were for non-calcified pulmonary metastases from non-metastatic lesions.

CLINICAL RELEVANCE/APPLICATION

The computerized 3D texture analysis can accurately differentiate pulmonary metastases from non-metastatic pulmonary lesions in pediatric osteosarcoma patients.

RC313-14 Extralobar pulmonary sequestration: initial CT findings predicting spontaneous regression in neonates

Tuesday, Dec. 1 11:30AM - 11:40AM Location: E353A

Participants
Hee Mang Yoon, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Jin Seong Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ahyoung Jung, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Young Ah Cho, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Chong Hyun Yoon, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

In general, it is accepted that extralobar pulmonary sequestration (EPS) may spontaneously regress. However, radiologic features associated with spontaneous regression of EPS have not been well documented. Therefore, we tried to find the CT features predicting spontaneous regression of EPS.

METHOD AND MATERIALS

A total of 51 patients were included in our study with the following inclusion criteria: (a) antenatally diagnosed with EPS, (b) underwent a CT scan within 1 month after birth, and (c) had more than one follow-up CT without treatment. Spontaneous regression of EPS was determined by percent decrease of volume (PDV) and decrease in diameter of feeders. Volume of EPS and diameters of feeding systemic arteries (FSA) were evaluated on all 148 CT. For the enhancement degree of EPS, CT attenuation number of EPS and the back muscle were measured on initial CT and the ratio of EPS-to-back muscle was calculated. The PDV and the changes in diameter of FSA between initial and follow-up CT scans were calculated. Univariate and multivariate linear regression analysis were performed to assess factors related to PDV and decrease in diameter of FSA.

RESULTS

PDV more than 50% (PDV≥50%) was noted in 20 patients (38.5%) within one year, in other 12 patients (23.1%) between one and two years, and in 6 patients after two years. The enhancement degree of EPS was significantly different between 38 patients with PDV≥50% and 13 patients with PDV<50 % (1.0±5.4 vs 2.1±1.1, respectively, p<0.001). Enhancement degree of EPS was the only significant factors predicting PDV≥50% (B=-26.227, p<0.001), and the decrease in diameter of FSA (B=-21.476, p=0.009). In addition, PDV showed significant correlation with decrease in the diameter of the FSA (r=0.602, p<0.001).

CONCLUSION

The volume of EPS had spontaneously decreased more than 50 % within 2 years without treatment in 63% of patients. The most important factor predicting spontaneous regression of the EPS was the enhancement degree on initial CT scan. Therefore, a significant volume regression and decrease in diameter of FSA can be expected without any treatment in a neonate with EPS showing hypoenhancement on initial CT scan.

CLINICAL RELEVANCE/APPLICATION

The enhancement degree of EPS on initial CT scan is significantly associated with spontaneous regression of EPS during follow-up. Based on this result, we can more confidently predict spontaneous regression of EPS in neonates.

RC313-15 Pediatric Chest Interventions

Tuesday, Dec. 1 11:40AM - 12:00PM Location: E353A

Participants
Kamlesh U. Kukreja, MD, Bellaire, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1. Describe different types of chest interventions for children.

RC314

Interventional Series: Embolotherapy

Tuesday, Dec. 1 8:30AM - 12:00PM Location: E351

VA IR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.50

FDA Discussions may include off-label uses.

Participants
Brian S. Funaki, MD, Riverside, IL (*Moderator*) Data Safety Monitoring Board, Novate Medical
Rakesh C. Navuluri, MD, Chicago, IL (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe rationale of bariatric embolization. 2) Explain the rationale and treatment of high flow malformations. 3) Describe the preparation of cyanoacrylates for embolization. 4) List two complications related to embolization. 5) Recognize the significance of Type III endoleaks. 6) Describe approach to treatment of visceral aneurysms.

Sub-Events

RC314-01 Using Glue-How I Do It

Tuesday, Dec. 1 8:30AM - 8:45AM Location: E351

Participants
Yasuaki Arai, Tokyo, Japan (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC314-02 Empiric Embolization in Endoscopically Confirmed Non-variceal Acute Upper Gastrointestinal Hemorrhage is Expensive and Fails to Improve Clinical Outcome

Tuesday, Dec. 1 8:45AM - 8:55AM Location: E351

Participants
Karunakaravel Karuppasamy, MBBS,FRCR, Westlake, OH (*Presenter*) Nothing to Disclose
Bradley Martin, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Gordon McLennan, MD, Chagrin Falls, OH (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, C. R. Bard, Inc; Research Consultant, C. R. Bard, Inc; Research Consultant, Medtronic, Inc; Research Consultant, Siemens AG; Research Consultant, Surefire Medical, Inc; Research Consultant, Rene Medical; Advisory Board, Siemens AG; Advisory Board, Surefire Medical, Inc; Advisory Board, Medtronic, Inc;
Abraham Levitin, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Baljendra S. Kapoor, MBBS, Cleveland, OH (*Abstract Co-Author*) Advisory Board, BTG International Ltd; Speaker, F. Hoffmann-La Roche Ltd
Mark J. Sands, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Ram Kishore R. Gurajala, MBBS, FRCR, Beachwood, NJ (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare clinical outcomes, radiation exposure and costs of empiric embolization to no embolization after a negative angiogram in patients with esophagogastroduodenoscopically (EGD) confirmed non-variceal acute upper gastrointestinal source of bleeding (GIB).

METHOD AND MATERIALS

A retrospective review was performed of patients who had angiogram after EGD confirmed upper GIB between May 2011 and April 2013. 64 patients (43 male, 21 female) had no contrast extravasation. They were divided into two groups. Group 1 (n=30) had no embolization. Group 2 (n=34) had empiric embolization of gastroduodenal artery (n=23) or left gastric artery (n=11). Logistic and linear regression analyses were used to compare the groups. After adjusting for age and Rockall score, following clinical outcomes were measured: 30-day mortality, hospital stay, repeat procedures and transfusion requirements. Radiation exposure (fluoroscopy time and reference point air kerma) in both groups and cost of embolization in group 2 were collected.

RESULTS

Patients in groups 1 and 2 were similar in age and had similar Rockall scores (68.3 vs. 67.5 years, p=0.80, and 7.1 vs. 7.3, p=0.53, respectively). The 30-day mortality (30.0% vs. 23.5% (p=0.58)) and the mean hospitalization after angiogram (25.2 vs. 23.0 days (p=0.67)) were similar. Patients who had at least one repeat procedure (angiogram or endoscopy) after the initial angiogram was similar (50% vs. 50%, p=1.0). Among the available transfusion records (group 1=15; group 2=14), there was no difference in the units of packed red blood cells transfused after the initial angiogram (4.6 vs. 5.4, p=0.80). Reference point air kerma was similar (2147 vs. 2773 mGy, p= 0.19) but the fluoroscopy time was significantly higher in group 2 (17.7 vs 24.7 min, p=0.03). A total of 183 coils and 34 coil pushers were used during 32 angiograms in group 2. The mean combined cost of coils and coil pushers was $1747 (SD 1573, range 30 to 6213).

CONCLUSION

In the absence of contrast extravasation, empiric embolization in acute non-variceal upper GIB fails to improve clinical outcomes compared to no embolization and is associated with higher fluoroscopy time and embolization costs.

CLINICAL RELEVANCE/APPLICATION

Small retrospective reviews have supported empiric embolization in acute upper GIB. However, with one of the largest series, our review fails to support the same which is associated with higher fluoroscopy time and costs.

RC314-03 Endovascular Management of Delayed Postpancreatectomy Hemorrhage

Tuesday, Dec. 1 8:55AM - 9:05AM Location: E351

Participants
Maxime Ronot, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Edwige Pottier, Villejuif, France (*Abstract Co-Author*) Nothing to Disclose
Sebastien Gaujoux, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Alain Sauvanet, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Valerie Vilgrain, MD, Clichy, France (*Presenter*) Nothing to Disclose

PURPOSE

To assess the efficacy of endovascular management of delayed postpancreatectomy hemorrhage (PPH) as first line treatment.

METHOD AND MATERIALS

Between January 2005 and November 2013, all consecutive patients referred for endovascular treatment of PPH were included. Presence of active bleeding, pseudoaneurysm, arterial stenosis, collection, and culprit artery were recorded on pretreatment CT scans. Endovascular procedures were classified as technical success if bleeding origin was identified and treated, technical failure if identified bleeding was incompletely treated; and radiologic abstention if no abnormality was depicted and no treatment performed. Factors associated with postprocedural rebleeding were analyzed, together with second line treatments.

RESULTS

69 patients (53 men) were included with a mean age of 59 years (32-75). Pretreatment CT showed 27 (39%) active bleeding, 25 (36%) pseudoaneurysms, 2 (3%) arterial stenosis, and 44 (64%) postoperative collections. In 22 (32%) cases, no obvious culprit artery was found. Technical success, technical failure , or radiologic abstention were observed in 48 (70%), 9 (13%), and 12 patients (17%), respectively. 30 patients (44%) experienced rebleeding after a median delay of 2 days (range 0-46). Rebleeding rates were 29%, 58%, and 100% in case of success, abstention or failure at the first endovascular procedure, respectively ($p < 0.001$). Treatment efficacy was the only factor associated with rebleeding (success vs failure $p < 0.001$; success vs. abstention $p = 0.09$, abstention vs. failure $p = 0.04$, overall $p < 0.001$). Rebleeding was treated by endovascular treatment, surgery, or both, in 12 (40%), 11 (37%) and 7 (23%) patients, respectively. Overall, 72% of the patients were successfully treated by endovascular procedures alone.

CONCLUSION

After a first endovascular procedure for PPH, almost half of patients rebleed. Rebleeding risk depends on the initial success of the procedure. Most patients are successfully treated by endovascular approach alone.

CLINICAL RELEVANCE/APPLICATION

Despite a high rebleeding rate, embolizaton should be proposed as first line treatment of post pancreatectomy hemorrhage because the majority of patients can be successfully treated by endovascular approach alone.

RC314-04 Preoperative Embolization to Enhance Collateral Blood Flow via the Gastroduodenal Artery in Patients Undergoing Distal Pancreatectomy with Resection of the Celiac Axis

Tuesday, Dec. 1 9:05AM - 9:15AM Location: E351

Participants
Markus Zimmermann, MD, Aachen, Germany (*Presenter*) Nothing to Disclose
Martin Liebl, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Maximilian F. Schulze-Hagen, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Federico Pedersoli, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Maximilian Schmeding, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Peter Isfort, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Christiane K. Kuhl, MD, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Philipp Bruners, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Locally advanced pancreatic cancer with infiltration of the celiac axis carries a grave prognosis and has previously widely been considered as irresectable. Nevertheless, selected patients may benefit from distal pancreatectomy with resection of the celiac axis (DP-CAR). However, resection of the celiac axis may result in postoperative hepatic or gastric ischemia if collateral blood flow from the superior mesenteric artery (SMA) via the gastroduodenal artery (GA) is insufficient. We present a technique for preoperative angiographic evaluation and possibly enhancement of blood flow in this collateral by embolization of the celiac axis (CA) or the common hepatic artery (CHA).

METHOD AND MATERIALS

Between 2010 and 2015 six patients with locally advanced pancreatic cancer with invasion of the celiac axis underwent preoperative angiography and embolization of the celiac axis (4) or the common hepatic artery (2) before DP-CAR.5F sheaths were placed in both common femoral arteries and through one sheath a catheter was introduced and placed in the SMA. Through the other sheath another catheter was simultaneously placed in the CA/CHA and an Amplatzer™ vascular plug was deployed - without releasing it - for temporary occlusion of the CA/CHA.Subsequently, an angiography of the SMA was performed to evaluate retrograde blood flow from the SMA via the GA to the proper hepatic artery.If sufficient retrograde flow via the GA was present, the Amplatzer™ plug was permanently released in order to further increase the flow rate in this collateral.

RESULTS

All six patients demonstrated sufficient collateral blood flow via the GA and consecutively underwent successful embolization of

either the CA or the CHA. No peri-interventional complications were noted. Eventually, five patients were treated with DP-CAR, of which four histologically demonstrated clear surgical margins (R0). One patient did not undergo DP-CAR because of intraoperatively discovered peritoneal metastases.

CONCLUSION

The presented technique allows safe preoperative angiographic evaluation and possibly enhancement of collateral bloodflow from the SMA via the GA in patients undergoing DP-CAR, in order to reduce the risk of postoperative morbidity from hepatic or gastric ischemia.

CLINICAL RELEVANCE/APPLICATION

Our technique allows preoperative evaluation and possibly enhancement of collateral blood flow from the SMA via the gastroduodenal artery in patients undergoing DP-CAR.

RC314-05 Embolotherapy-My Worst Cases

Tuesday, Dec. 1 9:15AM - 9:30AM Location: E351

Participants
Robert A. Morgan, MD, London, United Kingdom, (robert.morgan@stgeorges.nhs.uk) (*Presenter*) Proctor, Medtronic, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

RC314-06 The Type III Endoleak-The Great Pretender

Tuesday, Dec. 1 9:30AM - 9:45AM Location: E351

Participants
Brian S. Funaki, MD, Riverside, IL (*Presenter*) Data Safety Monitoring Board, Novate Medical

LEARNING OBJECTIVES

View learning objectives under main course title.

RC314-07 Case of the Session-Splenic Artery Embolization (or Lack Thereof)

Tuesday, Dec. 1 10:05AM - 10:20AM Location: E351

Participants
Brian S. Funaki, MD, Riverside, IL (*Presenter*) Data Safety Monitoring Board, Novate Medical

LEARNING OBJECTIVES

View learning objectives under main course title.

RC314-08 High Flow Malformations-How I Treat Them

Tuesday, Dec. 1 10:20AM - 10:35AM Location: E351

Participants
James E. Jackson, MD, London, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the indications for treatment of high-flow vascular malformations. 2) To understand the differing vascular anatomy of arteriovenous malformations and how this affects treatment approach and outcome. 3) To understand those methods of embolization of arteriovenous malformations that are likely to improve results and reduce complications.

ABSTRACT

The most important aspect of embolization of high-flow vascular malformations is an understanding of the anatomy of the vascular communications within them as this has a bearing both upon the method of vascular occlusion and on the final result. Whatever the anatomy, however, the general principle is that occlusion is performed at the site of the abnormal arteriovenous shunts and not in the vessel proximal to this point. The embolization of arterial feeding vessels, which was performed for many years with metallic coils or particulate matter such as polyvinyl alcohol, is akin to proximal surgical ligation and must be avoided. It has little effect upon symptoms in most individuals and renders subsequent treatment more difficult because the arterial inflow vessels have been occluded. If, however, the embolization is directed at the AV communications themselves, from an arterial approach, via a direct percutaneous puncture or retrogradely from the venous side, and these are totally obliterated - often with a liquid embolic agent - then a long-term improvement in symptoms can be achieved. This presentation will concentrate on the radiological management of these high-flow lesions.The cure of a high flow vascular anomaly is uncommon although there is no doubt that radiological and clinical obliteration of more malformations has come with a better understanding of their radiological anatomy and the use of agents that are directed at the AV shunts themselves rather than at the proximal feeding vessels.

RC314-09 Value of Embolization in the Management of Pelvic Venous Incompetence

Tuesday, Dec. 1 10:35AM - 10:45AM Location: E351

Participants
Marc Antoine Jegonday, Caen, France (*Presenter*) Nothing to Disclose
Vincent Le Pennec Sr, MD, Caen, France (*Abstract Co-Author*) Educator, Cook Group Incorporated
Audrey Fohlen, Caen, France (*Abstract Co-Author*) Nothing to Disclose
Bertrand Lamy, Caen, France (*Abstract Co-Author*) Nothing to Disclose

Jean-Pierre J. Pelage, MD, PhD, Caen, France (*Abstract Co-Author*) Research Grant, Merit Medical Systems, Inc; Consultant, Merit Medical Systems, Inc; Research Grant, Cook Group Incorporated; Consultant, Cook Group Incorporated; Research Grant, Keocyt; Medical Board, Keocyt; Research Grant, Terumo Corporation; Consultant, Terumo Corporation; Research Grant, ALN; Consultant, ALN; Consultant, Boston Scientific Corporation; Research Grant, BTG International Ltd

PURPOSE

To assess the efficacy of embolotherapy to treat symptomatic pelvic venous incompetence (PVI).

METHOD AND MATERIALS

Retrospective evaluation of women with symptomatic PVI treated with embolization. Primary clinical success defined as decrease in pelvic and lower limb pain using a visual analogue scale (VAS). Associated symptoms including dyspareunia, vulvar pain or lower limb venous insufficiency as well as complications were also assessed.

RESULTS

A total of 114 women (mean age 40.9 ± 10.3 years) including 74% with pelvic pain (VAS of 6.5 ± 1.8) and 64% with lower limb pain (VAS of 5.6 ± 2.1) were treated. The most common incompetent veins were the left ovarian (82%), internal pudendal (right 49%; left 39%), inferior gluteal (right 32%; left 31%) and uterine (right 19%; left 23%) veins. Technical success was 89%. Follow-up included consultation organized after 3.5 ± 4.0 months and consultation or telephone interview after 50 ± 34.6 months, respectively. Pelvic pain VAS decreased to 1.6 ± 2.4 ($p<0.0001$) and 1.0 ± 2.2 ($p<0.0001$) at the first and second visits, respectively, with a long term success of 94%. Mean lower limb pain VAS decreased to 3.6 ± 2.7 ($p<0.0001$) and 2.5 ± 2.6 ($p<0.0001$) at the 2 time-points, with a long term success of 88%. VAS decreased significantly between short and long term evaluations. Clinical improvement of associated symptoms was also observed. Major complication rate was low (9%).

CONCLUSION

Embolization of symptomatic PVI is a safe and effective treatment in well-selected patients, with a progressive and long-lasting clinical success.

CLINICAL RELEVANCE/APPLICATION

Embolization is safe and effective to treat symptomatic PVI and is recommended when a pelvic venous origin of symptoms is etablished.

RC314-10 Endovascular Management of Hemoptysis Including Coil and/or Particle Embolization: 6 Year Single Institution Comparative Experience

Tuesday, Dec. 1 10:45AM - 10:55AM Location: E351

Participants
Orrie N. Close, MD, Pittsburgh, PA (*Presenter*) Nothing to Disclose
Kevin M. McCluskey, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Donghoon Shin, MS, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Kevin Ching, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Robert F. Short, MD, PhD, Charlottesville, VA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate clinical outcomes for endovascular treatment of hemoptysis with microcoils and/or microparticles for bronchial and non-bronchial systemic artery embolization

METHOD AND MATERIALS

A single institution IRB-approved review included all patients who underwent embolization for hemoptysis from 12/2008 to 12/2014. Patient demographics, technical details, angiographic findings, complications, rate of recurrence, and need for repeat intervention were reviewed. Person-years were calculated to evaluate the incidence of recurrence by endovascular treatment method. Statistical analyses were performed using Fisher's exact and chi-square tests.

RESULTS

114 embolizations were performed in 97 patients for hemoptysis. 56 embolization procedures performed in 48 patients (mean: 58 y; range 20-91y) employed microcoils (<0.18 inch). (Of these, 10 patients received microcoil embolization only.) 58 microparticle embolizations were performed in 49 patients (52 y; range 24-84y). Rebleeding occurred following 23 (41.1%) coil embolizations and 24 (42.1%) microparticle embolizations ($p=1.00$). Incidence of rebleeding in the coil and particle embolization groups were 50.6 and 64.6 per 100 person-years respectively ($p=.5$). The incidence ratio between the groups was 1.28 (95% CI: 0.69, 2.37). Complication rate was 7.1% in the coiling group (bronchial arterial dissections: n= 4) vs. 10.3% in the particle embolization only group (arterial dissections: n= 4, spinal cord infarction: n= 1, and access site retroperitoneal hemorrhage: n= 1). ($p= 1.0$). One procedure for recurrent hemorrhage was impeded by previously placed embolization coils.

CONCLUSION

Transcatheter embolization for hemoptysis is safe and effective using microcoils and/or microparticles. The incidence rate of recurrent hemoptysis following microcoil vs. microparticle embolization is not significantly different.

CLINICAL RELEVANCE/APPLICATION

Use of microcoils for transcatheter embolization in the treatment of hemoptysis can be safely performed with similar clinical efficacy and complication rates as that of microparticles.

RC314-11 Amplatzer Plugs versus Coils for Pulmonary Arteriovenous Malformations Embolization in HHT Patients - Long Term Results

Tuesday, Dec. 1 10:55AM - 11:05AM Location: E351

Participants

Noam Tau, MD, Petah Tikva, Israel (*Presenter*) Nothing to Disclose
Eli Atar, MD, Petah Tikva, Israel (*Abstract Co-Author*) Nothing to Disclose
Meir Mei-Zahav, MD, Petach Tikva, Israel (*Abstract Co-Author*) Nothing to Disclose
Tamir Dagan, MD, Petach Tikva, Israel (*Abstract Co-Author*) Nothing to Disclose
Einat Birk, MD, Petach Tikva, Israel (*Abstract Co-Author*) Nothing to Disclose
Elchanan Bruckheimer, MBBS, Petach Tikva, Israel (*Abstract Co-Author*) Medical Director, RealView Imaging Ltd; Employee, RealView Imaging Ltd; Shareholder, RealView Imaging Ltd; Consultant, Getinge AB; Consultant, Valtec Cardio Ltd; Consultant, Enopace Biomedical Ltd; Medical Director, Vascular Platforms Ltd; Shareholder, Vascular Platforms Ltd; Medical Director, Restore Medical, Inc; Shareholder, Restore Medical, Inc

PURPOSE

Evaluation of safety and efficacy of Amplatzer vascular plugs in percutaneous embolization of PAVMs in HHT patients, and comparison to the use of coils.

METHOD AND MATERIALS

Retrospective analysis of all percutaneous PAVMs embolization performed between 2004 and 2014 in our institution. Data from patient files was collected regarding method of embolization (Amplatzer plugs, coils or both) and regarding all complications. Data regarding rates of re-canalization in treated PAVMs was assessed from follow-up imaging (following percutaneous procedure or CT Angiography).

RESULTS

36 patients [19M, 17F], median age 32.5 years [1.9-72.7 years] underwent 51 percutaneous trans-catheter procedures at our institution and 8 procedures in outside institutions, with embolization of a total of 142 simple or complex PAVMs [72 coils, 56 Amplatzer plugs and 14 plugs and coils]. Two patients had self-resolving mild hemoptysis following embolization. No other major procedure-related complications occurred.Of this group, 16 patients with 63 PAVMs that were occluded [37 with coils, 21 with Amplatzer plugs and 5 with both plugs and coils] underwent follow-up imaging [13 angiographies, 1 CT Angiography].7 PAVMs showed re-canalization of occluded vessels, at a median follow-up of 8.6 years [1.5-18.11 years].All re-canalizations occurred in coiled vessels. No re-canalizations occurred through Amplatzer plugs [7/37 vs. 0/21], p-value = 0.0413 (Fisher's exact test).

CONCLUSION

The use of Amplatzer plugs for PAVMs embolization in HHT patients appears to be safe and effective, and has a lower re-canalization rate of feeding vessels compared to coils.

CLINICAL RELEVANCE/APPLICATION

The use of coils as the standard of care for PAVMs embolization should be re-evaluated, since the use of Amplatzer vascular plugs is shown to have better long term results, without additional risks.

RC314-12 Bariatric Embolization for Morbid Obesity, First Western Hemisphere Experience: Gastric Artery Embolization Trial for Lessening Appetite Nonsurgically (GET LEAN)

Tuesday, Dec. 1 11:05AM - 11:15AM Location: E351

Participants
Mubin I. Syed, MD, Dayton, OH (*Presenter*) Consultant, CareFusion Corporation;
Kamal Morar, MD, Dayton, OH (*Abstract Co-Author*) Nothing to Disclose
Azim Shaikh, MD,MBA, Dayton, OH (*Abstract Co-Author*) Nothing to Disclose
Paul Craig, MD, MA, Minneapolis, MN (*Abstract Co-Author*) Nothing to Disclose
Talal Akhter, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Hooman Khabiri, MD, Columbus, OH (*Abstract Co-Author*) Nothing to Disclose
Omar Khan, Dayton, OH (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The purpose of this pilot study is to achieve the collection of safety and efficacy data in patients undergoing left gastric artery embolization for morbid obesity in the Western Hemisphere.

METHOD AND MATERIALS

This is an FDA-IDE pilot study. 5 patients have been approved to undergo the left gastric artery embolization procedure for the purpose of weight loss using Beadblock 300-500 micron particles. All patients will undergo EGD follow up pre and post procedure. Ghrelin, Leptin and CCK levels will also be measured at baseline and post procedure per follow up protocol. Inclusion Criteria Morbid obesity with a BMI ≥ 40 Age ≥ 22years Ability to lay supine on an angiographic table <400lbs due to table weight limits Appropriate anesthesia risk as determined by certified anesthesia provider evaluation preprocedureSubjects who have failed previous attempts at weight loss through diet, exercise, and behavior modification (as it is recommended that conservative options, such as supervised low-calorie diets combined with behavior therapy and exercise, should be attempted prior to enrolling in this study).

RESULTS

The first patient has lost 30lbs at 3 months. Second patient has lost 12lbs at 1 month. Third patient has lost 6lbs in 1 week. There have been no major adverse events. The final 2 patients in this study are still being selected.

CONCLUSION

This is the first experience in the United States of performing left gastric artery embolization for the purpose of treating morbid obesity. Early results are promising and show no major adverse events thus far. The radial artery has also proven to be a feasible approach to performing this procedure with implications for a safer access site.

CLINICAL RELEVANCE/APPLICATION

Morbid obesity is a prevalent and deadly public health problem. Obesity affects about 30% of the United States population. It is responsible for numerous comorbidities including diabetes mellitus and its complications, cardiovascular disease, sleep apnea, and premature osteoarthritis. This is the first use of left gastric artery embolization in the Western Hemisphere to treat morbid obesity.

This is also the first radial artery access experience with implications for the morbidly obese where groin access may be more challenging.

RC314-13 Bariatric Embolization. Is This the Next Big Thing?

Tuesday, Dec. 1 11:15AM - 11:30AM Location: E351

Participants
Mubin I. Syed, MD, Dayton, OH (*Presenter*) Consultant, CareFusion Corporation;

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Bariatric embolization is an exciting new procedure for the postential treatment of obesity. This talk outlines the background behind the procedure as well as the latest human experience.

RC314-14 Visceral Aneurysms

Tuesday, Dec. 1 11:30AM - 11:45AM Location: E351

Participants
Michael D. Darcy, MD, Saint Louis, MO (*Presenter*) Speakers Bureau, W. L. Gore & Associates, Inc; Speaker, Cook Group Incorporated;

LEARNING OBJECTIVES

1) The incidence and presentation of visceral aneurysms. 2) The indications for treating visceral aneurysms. 3) Techniques for treating visceral aneurysms. 4) Potential complications from treatment of visceral aneurysms.

RC314-15 Wrap Up and Discussion

Tuesday, Dec. 1 11:45AM - 12:00PM Location: E351

Participants

RC315

Breast Series: Emerging Technologies in Breast Imaging

Tuesday, Dec. 1 8:30AM - 12:00PM Location: Arie Crown Theater

BR MR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Emily F. Conant, MD, Philadelphia, PA (*Moderator*) Speaker, Hologic, Inc; Scientific Advisory Board, Hologic, Inc; Consultant, Siemens AG
Margarita L. Zuley, MD, Pittsburgh, PA (*Moderator*) Research Grant, Hologic, Inc;
Bonnie N. Joe, MD, PhD, San Francisco, CA (*Moderator*) Nothing to Disclose

Sub-Events

RC315-01 MRI Acquisition and DWI

Tuesday, Dec. 1 8:30AM - 8:50AM Location: Arie Crown Theater

Participants
Savannah C. Partridge, PhD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the basics of clinical breast MRI acquisition. 2) Identify factors that may impact image quality and interpretation. 3) Describe advanced MRI approaches with potential value for breast imaging.

ABSTRACT

RC315-02 Correlation of R2* Value Using Iterative Decomposition of Water and Fat with Echo Asymmetry and Least-squares Emission (IDEAL) with Histologic Prognostic Factor and Hypoxic Biomarker

Tuesday, Dec. 1 8:50AM - 9:00AM Location: Arie Crown Theater

Participants
Mari Miyata, MD, Kitakyushu, Japan (*Presenter*) Nothing to Disclose
Takatoshi Aoki, MD, PhD, Kitakyushu, Japan (*Abstract Co-Author*) Nothing to Disclose
Atsuji Matsuyama, MD, Kitakyushu, Japan (*Abstract Co-Author*) Nothing to Disclose
Shohei Shimajiri, MD, Kitakyushu, Japan (*Abstract Co-Author*) Nothing to Disclose
Shunsuke Kinoshita, Kitakyushu, Japan (*Abstract Co-Author*) Nothing to Disclose
Yukunori Korogi, MD, PhD, Kitakyushu, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshiko Hayashida, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Hypoxic breast cancers are difficult to treat by radiation and chemotherapy, and a fibrotic focus (FF) induced by hypoxia is an important predictor of early tumor recurrence. The purpose of this study is to correlate R2* value using iterative decomposition of water and fat with echo asymmetry and least-squares emission (IDEAL) with FF and hypoxic biomarker (HIF-1α) in breast carcinoma.

METHOD AND MATERIALS

This study consisted of 30 patients who were diagnosed with invasive carcinoma of breast and underwent breast MRI including IDEAL before surgery. The scan time of IDEAL R2* map imaging was 23 sec. Entire region of interest (ROI) was delineated on the R2* map carefully, and average tumor R2* value was calculated for each ROI. Histological specimens were evaluated for the presence of FF (a scar-like lesion near the center of a carcinoma) and the grading of HIF-1α (0, no staining; 1, weakly positive and/or positive cells in less than 10 %; 2, moderately positive and/or positive cells in 10-50 %; 3, strongly positive and/or positive cells in more than 50 %) by 2 pathologists and final decision was reached by consensus.

RESULTS

Fibrotic focus was identified in 43.3% (13/30) breast carcinomas. Average R2* value for breast carcinoma with FF (45.1±18.9) was significantly higher than that without FF (29.8±13.9) ($p<0.05$). Spearman rank correlation suggested that average R2* value correlated with the grade of HIF-1α ($p<0.05$), and the grade of HIF-1α with FF was significantly higher than that without FF ($p < 0.01$).

CONCLUSION

Quantification of tumor R2* using IDEAL is associated with the presence of FF and the overexpression of HIF-1α, and may therefore be a useful prognostic and hypoxic biomarker for breast carcinoma.

CLINICAL RELEVANCE/APPLICATION

In vivo IDEAL-R2*imaging is simple to perform without extrinsic contrast agent and the R2* value may be useful for therapeutic strategy for breast carcinoma.

RC315-03 Apparent Diffusion Coefficient Values of Breast Cancer and Normal Breast Tissue in Diffusion-weighted Imaging: Effects of the Menstrual Cycle and Menopausal Status

Tuesday, Dec. 1 9:00AM - 9:10AM Location: Arie Crown Theater

Participants
Jin You Kim, MD, Busan, Korea, Republic Of (*Presenter*) Nothing to Disclose
Shinyoung Park, MD, Busan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jin Il Moon, MD, Busan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ji Won Lee, MD, Busan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Suk Kim, MD, Pusan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate whether the apparent diffusion coefficient (ADC) values of breast tumor and normal fibroglandular tissue vary with the menstrual cycle and menopausal status.

METHOD AND MATERIALS

The institutional review board approved this prospective study, and informed consent was obtained from each participant. Forty-six patients (20 premenopausal and 26 postmenopausal) with newly diagnosed breast cancer underwent diffusion-weighted (DW) imaging with b values of 0 and 1,000 s/mm2 twice (interval 12-21 days) before surgery. Two radiologists independently measured the ADC values of the breast tumor and normal fibroglandular breast tissue of the contralateral breast and the differences according to the phases of the menstrual cycle and postmenopausal breast were evaluated. The reproducibility of the ADC measurement was analyzed using the intraclass correlation coefficient (ICC).

RESULTS

The ADC values of normal fibroglandular tissue were significantly higher in premenopausal women than in postmenopausal women (1.77±0.25×10-3 vs. 1.53±0.12×10-3 mm2/s; P = 0.007). In premenopausal women, the ADC values of the breast tumor did not differ significantly between the proliferative and secretory phases of the menstrual cycle (0.92±0.128×10-3 vs. 0.93±0.150×10-3 mm2/s; P = 0.421). No significant differences were observed in the ADC values of normal breast tissue in relation to the menstrual cycle phase (1.74±0.22×10-3 vs. 1.77±0.25×10-3 mm2/s; P = 0.202). In postmenopausal women, there were no significant differences in the ADC values of either breast tumors or normal fibroglandular tissue between the two time intervals (P = 0.983 and P = 0.363, respectively); the magnitude of the ADC differences was similar in women who were taking estrogen-replacement therapy and those who were not (P = 0.368 and P = 0.418, respectively). The intra- and interobserver agreement was excellent for all of the ADC measurements, with ICCs ranging from 0.84 to 0.94.

CONCLUSION

The ADC values of breast cancer and normal fibroglandular tissue are not affected by the change in the menstrual cycle and the ADC measurements are highly reproducible within and across observers.

CLINICAL RELEVANCE/APPLICATION

Since ADC values are not influenced by the change in the menstrual cycle, it is not necessary to restrict the timing of performing diffusion-weighted imaging of the breast to a certain phase of the menstrual cycle.

RC315-04 Unenhanced Breast MRI (STIR, T2-weighted TSE, DWIBS): An Accurate and Alternative Strategy for Detecting and Differentiating Breast Lesions

Tuesday, Dec. 1 9:10AM - 9:20AM Location: Arie Crown Theater

Participants
Marco Moschetta, MD, Bari, Italy (*Presenter*) Nothing to Disclose
Michele Telegrafo, MD, Bari, Italy (*Abstract Co-Author*) Nothing to Disclose
Leonarda Rella, Bari, Italy (*Abstract Co-Author*) Nothing to Disclose
Amato Antonio Stabile Ianora, Bari, Italy (*Abstract Co-Author*) Nothing to Disclose
Giuseppe Angelelli, Bari, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the role of STIR, T2-weighted TSE and DWIBS sequences for detecting and characterizing breast lesions and to compare unenhanced (UE)-MRI results with contrast enhanced (CE)-MRI and histological findings, having the latter as the reference standard.

METHOD AND MATERIALS

280 consecutive patients (age range, 27-73 years; mean age ± standard deviation (SD), 48.8 ± 9.8 years) underwent MR examination with a diagnostic protocol including STIR, T2-weighted TSE, THRIVE and DWIBS sequences. Two radiologists blinded to both dynamic sequences and histological findings evaluated in consensus STIR, T2-weighted TSE and DWIBS sequences and after two weeks CE-MRI images searching for breast lesions. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and diagnostic accuracy for UE-MRI and CE-MRI were calculated. UE-MRI results were also compared with CE- MRI.

RESULTS

UE-MRI sequences obtained sensitivity, specificity, diagnostic accuracy, PPV and NPV values of 94%, 79%, 86%, 79% and 94 %, respectively. CE-MRI sequences obtained sensitivity, specificity, diagnostic accuracy, PPV and NPV values of 98%, 83%, 90%, 84% and 98%, respectively. No statistically significant difference between UE-MRI and CE-MRI was found.

CONCLUSION

Breast UE-MRI could represent an accurate diagnostic tool and a valid alternative to CE-MRI for evaluating breast lesions. STIR and DWIBS sequences allow to detect breast lesions while T2-weighted TSE sequences and ADC values could be useful for lesion characterization.

CLINICAL RELEVANCE/APPLICATION

Unenhanced MR imaging of the breast including STIR, T2-weighted TSE and DWIBS sequences could characterize breast lesions, although not yet able to avoid histological characterization.

RC315-05 Breast Cancer: Feasibility and Preliminary Experience of Diffusion Kurtosis Imaging for Detection and Assessment of Invasive Ductal Carcinoma Comparing with Intravoxel Incoherent Motion and Conventional Diffusion-weighted Imaging

Tuesday, Dec. 1 9:20AM - 9:30AM Location: Arie Crown Theater

Participants
Kun Sun, Shanghai, China (*Presenter*) Nothing to Disclose
Fuhua Yan, MS, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the feasibility of diffusion-kurtosis imaging (DKI) for distinguishing benign from malignant breast lesions in comparison with IVIM and conventional DWI

METHOD AND MATERIALS

The institutional review board approved this retrospective HIPAA-compliant study and waived informed consent. Twenty-five breast disease patients who underwent surgery from January 2014 and April 2014 were retrospectively analyzed. Multi-b-value diffusion images with five b values (range:0-2800s/mm²) were acquired and processed using the DKI model, yielded kurtosis (K),and corrected diffusion(D) coefficient, similarly, IVIM model was also acquired with 5 b values(range:0-200s/mm²), yielded D*,D,f,ADC, The apparent diffusion coefficient (ADC) was also calculated using the conventional mono-exponential diffusion weighted imaging (DWI) model with 2 b values(50,1000) .Two radiologists reviewed these maps and measured the all these parameters. Two independent sample t test was employed and receiver operating characteristic curves were plotted for data analysis.

RESULTS

Among the 25 patients, 15(60%) were invasive ductal carcinoma and 10 (40%) were fibroadenoma. The area under the curve for all these parameters as following: DKI model: 0.973 for K, 0.967 for D;IVIM model::0.74 for D*,:0.793 for D, 0.673 for f, 0.947 for ADC; Conventional DWI: 0.90 for ADC. Then we chosen K represent DWI model, IVIM-ADC represent IVIM model, ADC represent Conventional DWI model to compare the diagnostic accuracy. Although the area under the curve of K was relatively higher than IVIM-ADC and Conventional ADC, there's no significant difference (P>0.05).K was significantly higher in the malignant lesions than in the benign lesions (0.91±0.13vs.0.68±0.10,P<0.0001). IVIM- ADC and Conventional ADC were significantly lower in the malignant lesions than in the benign lesions (0.93±0.14 vs.1.05±0.20 and 1.53±0.35 vs.1.60±0.43, respectively, P<0.0001).

CONCLUSION

DKI model had a similar diagnostic ability with IVIM and DWI model in assessing benign and malignant breast lesions. Performing DKI model with quantification K values reduces the overlap between benign and malignant lesion than ADC values from IVIM and DWI model.

CLINICAL RELEVANCE/APPLICATION

DKI model had a similar diagnostic ability with IVIM and DWI model in assessing benign and malignant breast lesions.

RC315-06 DBT Technology

Tuesday, Dec. 1 9:30AM - 9:50AM Location: Arie Crown Theater

Participants
Martin J. Yaffe, PhD, Toronto, ON (*Presenter*) Research collaboration, General Electric Company Founder, Matakina International Ltd Shareholder, Matakina International Ltd Co-founder, Mammographic Physics Inc

LEARNING OBJECTIVES

1) To review the basic principles of digital breast tomosynthesis (DBT). 2) Identify factors that may impact image quality and interpretation.

RC315-07 Detection and Classification of Calcifications on Two-dimensional Mammography: Comparison of Synthetic Mammography Reconstructed from Digital Breast Tomosynthesis and Full-field Digital Mammography

Tuesday, Dec. 1 9:50AM - 10:00AM Location: Arie Crown Theater

Participants
Ji Soo Choi, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Eun Young Ko, MD, PhD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Ga Ram Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Boo-Kyung Han, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Eun Sook Ko, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Soo Yeon Hahn, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the interpretative performance of two-dimensional (2D) synthetic mammography (SM) reconstructed from digital breast tomosynthesis (DBT) in the detection and classification of calcifications, compared to 2D full-field digital mammography (FFDM).

METHOD AND MATERIALS

The institutional review board approved this study, and the patients' informed consent was waived. Between January and October 2013, 73 patients with 81 calcifications (40 biopsy proven malignant calcifications, 24 biopsy-proven benign calcifications, 17 typical benign calcifications) were consecutively enrolled. For each patient, FFDM and DBT were performed, and SM was reconstructed from each set of DBT slices. Three breast radiologists, blinded to the histology, interpreted SM and FFDM images and recorded the conspicuity (three-point scale; 1 low conspicuity, 2 medium conspicuity, 3 high conspicuity) and the presence of calcifications, and corresponding BI-RADS categories. Diagnostic performance of SM was compared with that of FFDM in terms of percentage of detected calcifications (detection sensitivity) and the percentage of times each detected calcifications was

correctly classified as benign or malignant. BI-RADS category 2 was assigned as negative and BI-RADS category greater than or equal to 3 was assigned as positive.

RESULTS

There was no significant difference in detection sensitivity of calcifications between SM (range 91.4-95.1%) and FFDM (range 85.2-90.1%) for all readers (P>0.05). The conspicuity scores of SM and FFDM were also not significantly different for each observer (range of mean scores 1.9-2.8 for SM, 1.9-2.8 for FFDM; P > 0.05). For correct classification of calcifications, there was no significant difference between SM (68.9-74.0%) and FFDM (62.1-69.6%) for all readers (P>0.05). Of discordant cases between SM and FFDM, correct classifications were more frequent with SM, compared to FFDM for all readers.

CONCLUSION

Diagnostic performance of SM and FFDM are comparable for detection and classification of calcifications. Therefore, our results indicate that SM may overcome the limitation that DBT may underestimate the calcifications during DBT-based screening.

CLINICAL RELEVANCE/APPLICATION

SM may overcome the limitation that DBT may underestimate the calcifications. DBT with SM may be sufficient in the detection and classification of calcifications during DBT-based screening, without addition of FFDM

RC315-08 Comparison of Low Dose Tomosynthesis Plus Synthesized Mammography and Digital Mammography Alone for Breast Cancer Screening

Tuesday, Dec. 1 10:00AM - 10:10AM Location: Arie Crown Theater

Participants
Tokiko Endo, MD, Nagoya, Japan (*Presenter*) Institutional research support, FUJIFILM Holdings Corporation
Takako Morita, MD, Nagoya, Japan (*Abstract Co-Author*) Nothing to Disclose
Mikinao Ooiwa, Nagaya, Japan (*Abstract Co-Author*) Nothing to Disclose
Namiko Suda, Nagoya, Japan (*Abstract Co-Author*) Nothing to Disclose
Misaki Shiraiwa, MD, Nagoya, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazuaki Yoshikawa, MD, Hamada, Japan (*Abstract Co-Author*) Nothing to Disclose
Yukie Hayashi, Nagoya, Japan (*Abstract Co-Author*) Nothing to Disclose
Hirotoshi Ogawa, Nagoya, Japan (*Abstract Co-Author*) Nothing to Disclose
Takao Horiba, Kagamihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasuyuki Satoh, Nagoya, Japan (*Abstract Co-Author*) Nothing to Disclose
Shu Ichihara, Nagoya, Japan (*Abstract Co-Author*) Nothing to Disclose
Naokazu Kamiya, Ashigarakami-gun, Japan (*Abstract Co-Author*) Employee, FUJIFILM Holdings Corporation
Takahisa Arai, Ashigarakami-gun, Japan (*Abstract Co-Author*) Employee, FUJIFILM Holdings Corporation
Tomonari Sendai, Ashigarakami-Gun, Japan (*Abstract Co-Author*) Employee, FUJIFILM Holdings Corporation

PURPOSE

To compare the diagnostic performance (sensitivity, specificity and AUC) of breast tomosynthesis (DBT) plus synthesized mammography (S2D) with several-levels of dose reduction versus conventional digital mammography (FFDM) alone in breast cancer screening.

METHOD AND MATERIALS

An institutional review board approved this study and informed consent was provided by all patients. Images of 200 breasts were acquired from 100 subjects aged 27-86 years (mean, 53 years) who underwent FFDM and DBT with the same positioning and included both mediolateral oblique and craniocaudal views. All FFDM images were acquired at normal dose (AGD 0.65 ~ 4.16mGy). For DBT, half the patients were imaged at the same dose level (AGD 0.95 ~ 3.19mGy) of FFDM and the remainder at about 75% (AGD 0.87 ~ 2.7mGy). In addition, DBT + S2D images with 60% dose were generated virtually using approximately half the normal 15 projection images. The DBT + S2D images with dose reduction were processed by improved reconstruction algorithms. Eight radiologists specialized in breast imaging were divided equally into two groups and each group reviewed images of 100 breasts retrospectively. The FFDM and DBT + S2D images were interpreted independently with an interval of minimum 4 weeks for memory washout. Diagnostic performance was assessed by comparing sensitivity, specificity and area under the receiver operating characteristic (ROC) curve.

RESULTS

We found no significance difference in sensitivity and specificity between FFDM and DBT + S2D acquired with normal dose. Furthermore, FFDM and DBT + S2D acquired with 75% dose showed a significant difference in sensitivity (P = .043) keeping specificity and AUC because spiculated or lobulated masses were more precisely identified by the improved DBT images.

CONCLUSION

Dose reduction is possible with DBT + S2D in screening with the same sensitivity and specificity as FFDM. In addition, the improvement of reconstruction algorithm has the potential to provide higher sensitivity, even when the dose is reduced more than 25% compared to FFDM.

CLINICAL RELEVANCE/APPLICATION

Screening by DBT + S2D with the improved reconstruction algorithm contributes to not only dose reduction, but also improved sensitivity keeping specificity.

RC315-09 Impact on Recall Rates Following Implementation of Synthesized 2D Mammography in Digital Breast Tomosynthesis Screening

Tuesday, Dec. 1 10:10AM - 10:20AM Location: Arie Crown Theater

Awards
Trainee Research Prize - Resident

Participants
Samantha P. Zuckerman, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Emily F. Conant, MD, Philadelphia, PA (*Abstract Co-Author*) Speaker, Hologic, Inc; Scientific Advisory Board, Hologic, Inc; Consultant, Siemens AG
Susan Weinstein, MD, Philadelphia, PA (*Abstract Co-Author*) Consultant, Siemens AG
Marie Synnestvedt, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Katrina Korhonen, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Elizabeth McDonald, MD, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The combination of digital breast tomosynthesis (DBT) with full field digital mammography (DM) decreases recall rates and improves cancer detection in breast cancer screening compared to using DM alone. Synthesized 2D images (s2D) are being used to replace conventional DM as a method to reduce dose. However, the reconstructed s2D images frequently have a different appearance varying by breast density and lesion type, particularly "calcification-only" lesions. We have evaluated the early implementation of s2D in a population screened entirely with s2D/DBT and compared recall rates and recall finding types to similar historic outcomes from DM/DBT screening. Comparison of cancer detection rate is on-going.

METHOD AND MATERIALS

Recall rates and lesion type were compared for 15,571 women screened with DM/DBT from October 1, 2011-February 28, 2013 and 2,090 women screened with s2D/DBT from January 7th, 2015 to March 20th, 2015. Data collection is on-going. Differences between groups were compared using Wilcoxon rank sum test.

RESULTS

Overall recall rate for s2D/DBT was 8.3% compared to 8.8% for DM/DBT (p=0.45). In addition, s2D/DBT screening was not associated with a significant change in the distribution of recalled lesion type. The percentage of screened patients recalled for calcifications, masses, asymmetries, architectural distortion and technical reasons was 1.6, 2.4, 3.8, 1.1 and 0.05 for s2D/DBT compared to 1.6, 2.7, 4.5, 1.0 and 0.2 for DM/DBT (p=ns). Specifically, there was no change in the rate of recall for calcific lesions.

CONCLUSION

Preliminary data demonstrates stable recall rates and lesion types with the replacement of DM with s2D in combination with DBT. Ongoing data collection will allow comparison of cancer detection rates and PPVs.

CLINICAL RELEVANCE/APPLICATION

The replacement of DM with s2D in combination with DBT will lead to decreased radiation dose in screening with DBT with maintenance of recall reduction.

RC315-10 Synthesized 2D Mammography+Tomosynthesis: Can We See Clearly?

Tuesday, Dec. 1 10:20AM - 10:30AM Location: Arie Crown Theater

Participants
Melissa A. Durand, MD, New Haven, CT (*Presenter*) Research Grant, Hologic, Inc
Madhavi Raghu, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Jaime L. Geisel, MD, New Haven, CT (*Abstract Co-Author*) Consultant, QView Medical, Inc; Consultant, Siemens AG
Regina J. Hooley, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Xiaopan Yao, PhD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Liane E. Philpotts, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Compare synthesized 2D mammography+tomosynthesis (C-view+Tomo) to 2D mammography+tomosynthesis (2D+Tomo) in a clinical setting.

METHOD AND MATERIALS

Screening mammograms were performed with C-view+Tomo and 2D+Tomo from 8/1/2014-1/9/2015. A hanging protocol showed C-view+Tomo first, followed by 2D+Tomo. Findings (calcifications, asymmetries, masses, architectural distortions) on C-view+Tomo were prospectively assessed as better, equally, or less well seen compared to 2D+Tomo. Separate BIRADS final assessments were recorded and Kappa statistics assessed agreement. Recall and cancer detection rates were compared with Fisher's exact test. Multivariate logistic regression analysis determined effect of breast density or age on visualization of C-view+Tomo findings.

RESULTS

201 C-view+Tomo and 2D+Tomo mammograms were performed. 4 types of findings were recorded (calcifications 50.8%,102/201;asymmetries 28.9%,58/201;masses 14.4%,29/201;architectural distortions 6.0%,12/201). 53.7% (108/201) were not dense and 46.3% (93/201) were dense; average age 56 years. 82.1% (165/201) of findings were equally/better seen with C-view+Tomo, 17.9% (36/201) less well seen. This was most evident for architectural distortions and calcifications (architectural distortions 100%,12/12); calcifications 96.1%,98/102;asymmetries 63.8%,37/58;masses 62.1%,18/29). Logistic regression models showed neither density nor age had a significant effect on visibility of findings (p 0.8358 density;p 0.3336 age). Kappa statistics showed perfect agreement in BIRADS assessment for architectural distortions (K 1.0000), strong agreement for asymmetries (K 0.9695) and masses (K 0.9247), moderate agreement for calcifications (K 0.7850). Recall rates were not significantly different (C view: 10.9%,22/201; 2D: 9.45%,19/201); p 0.7421). All recalled patients returned for diagnostic imaging. 6 biopsies were performed and 2 malignancies found (PPV1:10.5%;PPV3:33.3%). Cancer detection rate was the same as both cancers were identified on both modalities.

CONCLUSION

C-view+Tomo shows the majority of mammographic findings equally well/better than 2D+Tomo, regardless of breast density or age, with equitable recall rates and cancer detection.

CLINICAL RELEVANCE/APPLICATION

Visibility of findings on C-view+Tomosynthesis is at least equal to 2D, with no significant difference in recall rates or cancer detection, and suggests potential as a screening modality.

RC315-11 Synthetized Digital Mammography Compared to Conventional Digital Mammography in a Diagnostic Setting

Tuesday, Dec. 1 10:30AM - 10:40AM Location: Arie Crown Theater

Participants
Giovanna Mariscotti, Turin, Italy (*Abstract Co-Author*) Nothing to Disclose
Manuela Durando, Turin, Italy (*Presenter*) Nothing to Disclose
Camilla Bogetti, MD, Torino, Italy (*Abstract Co-Author*) Nothing to Disclose
Pier Paolo Campanino, Turin, Italy (*Abstract Co-Author*) Nothing to Disclose
Elisa Regini, Torino, Italy (*Abstract Co-Author*) Nothing to Disclose
Mirella Fasciano, Turin, Italy (*Abstract Co-Author*) Nothing to Disclose
Giulia Schivazappa, Turin, Italy (*Abstract Co-Author*) Nothing to Disclose
Enrica Caramia, Turin, Italy (*Abstract Co-Author*) Nothing to Disclose
Alessia Milan, Torino, Italy (*Abstract Co-Author*) Nothing to Disclose
Paolo Fonio, Vercelli, Italy (*Abstract Co-Author*) Nothing to Disclose
Giovanni Gandini, MD, Torino, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare the diagnostic performances of conventional Digital Mammography (DM) versus Synthetized Digital Mammography (SDM) used alone (without combination with Digital Breast Tomosynthesis (DBT) images) in the identification and characterization of breast malignant and benign lesions in a diagnostic setting.

METHOD AND MATERIALS

A retrospective observer performance study was performed using anonymized images acquired between August 2014 and January 2015 (compliant to protocols approved by the Institutional Ethic Committee). The sample included 120 consecutive patients with 73 biopsy-proven cancer (confirmed histologically) and 64 biopsy-proven benign lesions. All patients (after signing an informed consent) had undergone DM combined to DBT; SDM images were obtained in both standard views. Two dedicated breast radiologists, blinded to the clinical information and histological diagnosis, retrospectively reviewed all the studies. The readers reviewed separately DM images and then SDM studies, in a different order. BIRADS category was used for the classification of the findings in both techniques. Mammographic features (mass, architectural distortion, microcalcification, asymmetry) were also indicated. A statistical analysis was performed on the data, by evaluating the differences in sensitivity (SE), specificity (SP), negative and positive predictive value (NPV and PPV) between DM and SDM. Accuracy was calculated by using areas under the receiver operating characteristic curve (AUC) for both techniques.

RESULTS

The SE and SP were respectively 78.6% and 67.9% for DM and 87.1% and 63.5% for SDM. No significant differences were found regarding SE and SP between DM and SDM (p=0.14 and 0.63). The AUC was 0.75 for DM and 0.81 for SDM. There were not significant differences between both AUC´s (p=0.27). By stratifying the results according to mammographic features, SDM better identified and classified (according to BIRADS category) architectural distortions than DM.

CONCLUSION

In our study, SDM alone is comparable in performance to DM, demonstrating a similar SE, SP and AUC values; SDM could be used instead of DM in addition to DBT images as part of routine clinical study.

CLINICAL RELEVANCE/APPLICATION

Preliminary studies suggest that SDM alone is comparable in performance to DM, so it could be used instead of DM in addition to DBT images as part of routine clinical study.

RC315-12 Clinical Evidence of DBT Utility

Tuesday, Dec. 1 10:50AM - 11:10AM Location: Arie Crown Theater

Participants
Sarah M. Friedewald, MD, Chicago, IL (*Presenter*) Consultant, Hologic, Inc; Research Grant, Hologic, Inc

LEARNING OBJECTIVES

1) Acquire brief knowledge of the basics of tomosynthesis aquisition, interpretation and implementation. 2) Learn the clinical evidence that supported FDA approval for tomosynthesis. 3) Describe the European Clinical Evidence. 4) Describe the American Clinical Evidence. 5) Be aware of the additional studies needed for further research.

RC315-13 Tomosynthesis in Diagnostic Mammography - Continued Change after Three Years of Experience

Tuesday, Dec. 1 11:10AM - 11:20AM Location: Arie Crown Theater

Participants
Reni S. Butler, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Vivek B. Kalra, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Jaime L. Geisel, MD, New Haven, CT (*Abstract Co-Author*) Consultant, QView Medical, Inc; Consultant, Siemens AG
Jacquelyn Crenshaw, RT, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Liane E. Philpotts, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess how the initial impact of tomosynthesis on the diagnostic work-up changes with increasing experience over a 3 ½ year

time interval.

METHOD AND MATERIALS

After IRB approval, a HIPAA-compliant retrospective review of diagnostic mammography examinations was performed before and at three time points over a 3 ½ year period after tomosynthesis implementation. Diagnostic exams were performed on 2D digital mammography units (Selenia, Hologic, Bedford, MA) prior to tomosynthesis implementation and on both 2D and 3D digital breast tomosynthesis units (Dimensions, Hologic, Bedford, MA) in the 3 ½ years after implementation. Total number of additional views (AV), spot compression views (SCV) and magnification views (MV), were recorded during a one month period immediately prior to tomosynthesis (2D) and compared to one month periods during the second (3D1), third (3D2), and fourth year (3D3) after tomosynthesis utilization. The number of "routine" diagnostic studies, consisting only of MLO and CC views, was recorded for each time point. Statistical analysis was performed using the two-tailed student t-test with unequal variance.

RESULTS

The study population consisted of 497 2D diagnostic mammograms (2D) and 350 (3D1), 410 (3D2), and 314 (3D3) tomosynthesis diagnostic exams. AV, SCV and MV per exam decreased each year from 2.07, 0.84 and 0.85 (2D) to 1.42, 0.59 and 0.73 (3D1), 1.11, 0.33 and 0.41 (3D2), and 0.53, 0.23 and 0.20 (3D3), respectively. Significant differences were observed in all categories between 2D and 3D1, 3D1 and 3D2, and 3D2 and 3D3 ($p < 0.01$). Concordantly, the number of routine diagnostic exams increased from 29.9% (2D) to 41.4% (3D1), 44.9% (3D2), and 73.3% (3D3), ($p < 0.01$).

CONCLUSION

In the first 3½ years after tomosynthesis implementation, there has been a continual shortening of the diagnostic work-up from year to year. This data suggests a learning curve exists in developing comfort with utilizing tomosynthesis in the diagnostic setting and that, with time, fewer additional views are seen to be necessary. The majority of diagnostic cases require only the routine views, making the difference between screening and diagnostic mammography start to blend.

CLINICAL RELEVANCE/APPLICATION

Reported experience from a diagnostic center where tomosynthesis was adopted early may aid in shortening the learning curve at centers implementing tomosynthesis presently or in the future.

RC315-14 Biopsy Outcomes Following Diagnostic Work-up with Digital Breast Tomosynthesis

Tuesday, Dec. 1 11:20AM - 11:30AM Location: Arie Crown Theater

Participants
Madhavi Raghu, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Melissa A. Durand, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Hologic, Inc
Liva Andrejeva-Wright, MD, Wallingford, CT (*Abstract Co-Author*) Nothing to Disclose
Regina J. Hooley, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Jaime L. Geisel, MD, New Haven, CT (*Abstract Co-Author*) Consultant, QView Medical, Inc; Consultant, Siemens AG
Liane E. Philpotts, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare the positive predictive value of biopsies performed (PPV3) before and after the implementation of tomosynthesis.

METHOD AND MATERIALS

A retrospective review of all biopsies performed following diagnostic work-up with mammography before (2D: June 2010-June 2011) and three consecutive years (3D1:1/1/2012-12/31/2012; 3D2:1/1/2013-12/31/2014; 3D3:1/1/2014-12/31/2014) following the implementation of tomosynthesis was conducted. The recorded mammographic features of lesions recommended for biopsy (masses, architectural distortions (AD), calcifications (Ca++) and asymmetries) and subsequent pathology were evaluated. The PPV3 was compared and trends from year to year were evaluated.

RESULTS

A total of 3567(2D), 3385(3D1), 4542(3D2) and 4507 (3D3) diagnostic mammograms were performed. There was a nonsignificant slight decrease in the proportion of BI-RADS 4,5 studies: 2D 8.5% (304/3567), 3D1 7.9% (269/3385), 3D2 8.4% (384/4542), 3D3 7.7% (345/4507)) as well as biopsies performed over time: 2D 94% (287/304); 3D1 96% (257/269); 3D2 93% (358/384); 3D3 93% (321/345)). With tomosynthesis, there was a 40% increase in the PPV3 over time, from 29% in 2D (85/287) to 41.2% (3D1;106/257;p=.005), 45% (3D2;162/358;p<.0001) and 51.1% (3D3;164/321;p<.0001). Of the total malignancies in the 2D group, 69% were masses, 2.3% AD, 28% Ca++ and 0% asymmetries. With tomosynthesis there was an increase in the proportion of malignancies manifesting as noncalcified lesions, particularly masses (66%(3D1), 78%(3D2), 80%(3D3)) and AD (4.7%(3D1), 3.0% (3D2), 5.5%(3D3)), with a small proportion of cancers manifesting as asymmetries (3.8% (3D1), 1.9% (3D2) and 0%(3D3)). Over time, calcifications made up a smaller proportion of the malignancies (24.5%(3D1), 16.7%(3D2), 15.2%(3D3)).

CONCLUSION

Utilization of tomosynthesis resulted in a significant increase of 40% in the PPV3 for BIRADS 4, 5 lesions, demonstrating increased diagnostic acumen in characterizing lesions requiring biopsy.

CLINICAL RELEVANCE/APPLICATION

Diagnostic work up with tomosynthesis resulted in a significant and steady increase in the PPV.

RC315-15 Clinical and Imaging Features of Tomosynthesis Occult Breast Cancer and Reasons for Non-Detection

Tuesday, Dec. 1 11:30AM - 11:40AM Location: Arie Crown Theater

Participants
Liva Andrejeva-Wright, MD, Wallingford, CT (*Abstract Co-Author*) Nothing to Disclose
Regina J. Hooley, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Kaitlin Eng, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose

Jonathan R. Weisiger, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Madhavi Raghu, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Reni S. Butler, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Liane E. Philpotts, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Laura S. Sheiman, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the clinical and imaging features of tomosynthesis (DBT) occult cancers and determine reasons for non-detection of these cancers.

METHOD AND MATERIALS

This is a HIPPA compliant study with IRB approval. Between August 2011 and December 2014, a retrospective database review identified 32 cancers in 32 women diagnosed by breast ultrasound (US) or MR within one year of a normal combined DBT + 2D mammogram. Patient breast cancer risk, mammographic density, and tumor histology were assessed. Three radiologists blinded to clinical outcomes and study purpose reviewed each mammogram to determine if the cancers were truly mammographically occult. Two radiologists unblinded to clinical outcomes also reviewed each case in order to determine reasons why cancers were undetected.

RESULTS

The average patient age was 57 years (range 41-82). Breast cancer risk was average in 44% (14/32), intermediate in 22% (7/32), and increased in 34% (11/32). Breast density was scattered fibroglandular in 13% (4/32), heterogeneously dense in 69% (22/32), and extremely dense in 19% (6/32). Cancer detection was made by US in 75% (24/32) and by MR in 25% (8/32), with 4/9 MR detected cancers also identified on MR-directed US. Four cancers were DCIS and 28 were invasive, including 20 ductal and 8 lobular tumors. Of the invasive cancers 12 were grade1, 13 were grade 2, and 3 were grade 3. 63% (20/32) of the cancers were diagnosed more than two years since implementation of DBT. Upon case review, 72% (23/32) cases were truly occult on DBT and 28% (9/32) were seen retrospectively, including subtle findings in 16% (5/32) and interpretative errors in 13% (4/32). Of 4 cancers missed due to interpretive error, three were spiculated masses and one was a subtle architectural distortion (avg. tumor size 30 mm, range 13 - 66 mm).

CONCLUSION

The majority of DBT occult cancers were invasive, detected in women with dense breast tissue, and identified on US. These cancers may be seen in women across all risk groups and may occur despite more than two years of reader experience. Subtle masses and architectural distortions were the common findings in tumors identified retrospectively. Cancers missed due to interpretive error tended to be large.

CLINICAL RELEVANCE/APPLICATION

Despite the increased sensitivity of tomosynthesis combined with 2D mammography, some cancers may still be occult and radiologists should be aware of the limitations of tomosynthesis.

RC315-16 Comparing the Performance of Full-Field Digital Mammography (FFDM), Digital Breast Tomosynthesis (DBT) and Whole Breast Ultrasound (WBUS) in the Initial Staging Evaluation of Breast Cancer: Interim Results of a Prospective Study

Tuesday, Dec. 1 11:40AM - 11:50AM Location: Arie Crown Theater

Participants
Rosalind P. Candelaria, MD, Houston, TX (*Presenter*) Nothing to Disclose
Monica L. Huang, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Beatriz E. Adrada, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Elsa M. Arribas, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Marion E. Scoggins, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Wei T. Yang, MD, Houston, TX (*Abstract Co-Author*) Researcher, Hologic, Inc
Jennifer G. Schopp, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Mark J. Dryden, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
H. Carisa Le-Petross, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Tanya W. Moseley, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Gary J. Whitman, MD, Houston, TX (*Abstract Co-Author*) Book contract, Cambridge University Press
Gaiane M. Rauch, MD, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Lumarie Santiago, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine the incremental cancer detection rate (ICDR) of FFDM+DBT and FFDM+DBT+WBUS when compared to FFDM alone in the local staging of patients with recently diagnosed invasive breast cancer (BI-RADS 6) and patients with mammograms and/or ultrasound highly suspicious for invasive breast carcinoma (BI-RADS 5).

METHOD AND MATERIALS

This IRB-approved, prospective study was performed in a single, large tertiary cancer center. Informed written consent was obtained. We enrolled the first 100 women who were referred to our center from 12/2014-3/2015, met inclusion criteria and agreed to participate. All women had FFDM with DBT followed by WBUS; FFDM interpretation occurred blinded to DBT images. WBUS was performed with knowledge of FFDM/DBT results. Suspicious lesions on FFDM, DBT or WBUS farthest apart in the breast were biopsied to determine disease extent and to establish multifocality and/or multicentricity. Gold standard for diagnosis of malignancy was histopathology from needle biopsy and/or surgery. A separate surgical plan was recorded for each patient based on findings from FFDM alone, FFDM+DBT and FFDM+DBT+WBUS. In patients who did not have mastectomy, true negatives were defined by negative clinical and imaging assessment at 12-month follow-up (pending).

RESULTS

Median patient age was 54 years, range 26-82. Mean index tumor size was 2.1 cm, range 0.4-15. Mean satellite tumor size was 1.2

cm, range 0.4-4.2. Breast tissue density among the study group was predominantly fatty (1%), scattered fibroglandular (26%), heterogeneously dense (70%) and extremely dense (3%). ICDR of FFDM+DBT when compared to FFDM alone was 1% (exact 95% CI:0.02%-5.4%) in the ipsilateral and 0% (exact 95% CI:0%-5.7%) in the contralateral breast. ICDR of FFDM+DBT+WBUS when compared to FFDM alone was 20% (exact 95% CI:12.7%-29.2%) in the ipsilateral and 1.6% (exact 95% CI:0.04%-8.7%) in the contralateral breast. FFDM+DBT findings changed the surgical plan in 1% while FFDM+DBT+US findings changed the surgical plan in 20%.

CONCLUSION

Our interim analysis indicates that there is a greater increase in cancer detection in the ipsilateral and contralateral breasts when adding WBUS to FFDM, compared to adding DBT to FFDM.

CLINICAL RELEVANCE/APPLICATION

In large tertiary cancer centers, use of FFDM+DBT provides no significant advantage over FFDM when staging breast cancer; more studies are needed to establish proper indications for DBT in the diagnostic setting.

RC315-17 Analysis of False Negative Exams in 2D and Tomosynthesis Screening Mammography: Comparison by Breast Density

Tuesday, Dec. 1 11:50AM - 12:00PM Location: Arie Crown Theater

Participants
Liane E. Philpotts, MD, New Haven, CT (*Presenter*) Nothing to Disclose
Cameron Thomson, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Melissa A. Durand, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Hologic, Inc
Madhavi Raghu, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Regina J. Hooley, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

While digital breast tomosynthesis (DBT) has been shown to increase specificity in screening mammography, the sensitivity of this new modality has not yet been determined. The purpose of this study was to assess the false negative cases in patients undergoing screening with different technologies - 2D FFDM, DBT, +/- supplemental screening ultrasound.

METHOD AND MATERIALS

An IRB-approved, retrospective search of the breast imaging database (PenRad, MN) was performed to identify all screening mammograms over a two year period (8/1/11 - 7/31/13) when both DBT and 2D machines were utilized (Hologic Dimensions or Selenia) yielding 14, 295 DBT (8,291 not dense, 6,004 dense) and 10,132 2D (6,943 not dense, 3,189 dense) exams. Thirty percent of women with dense tissue underwent supplemental screening ultrasound (US). All false negative exams were identified through PenRad and reviewed for method of diagnosis, breast density, and cancer type and size.

RESULTS

The 2D cancer detection rate (per 1000) was significantly different for dense and non dense (7.3 versus 3.4, p=0.02) however, it was similar in the DBT group (not dense 5.3, dense 5.4). Eleven cancers were identified as false negatives (10 Invasive, 1 DCIS): 6 in the 2D group (6/10,132, 0.6 per 1000) and 5 in the DBT group (5/14,295, 0.3 per 1000)(p=0.56, NS). Five were palpable interval cancers (4 in the 2D group and 1 in the DBT group). Missed cancers in the DBT group were smaller (mean 10mm, range 5-15mm) and more likely to be diagnosed by MRI (3/5, 60%) compared to those in the 2D group, which were larger (mean 20mm, range 10-45mm) and palpable (4/6, 67%). The missed cancer rate in the dense patients (6/9,193, 0.7 per 1000) was not significantly different to not dense patients (5/15,234, 0.3 per 1000)(p=0.39, NS). Of 3000 patients undergoing screening US, only two interval cancers were identified; one as a palpable mass 8 months after screening US, and the other as a new 8mm mass found on 6 months follow up of a different BIRADS 3 lesion.

CONCLUSION

In our current practice, missed cancers were infrequent and occurred at a similar rate in dense as in non dense women. Cancers in false negative DBT exams were smaller and more likely to be found by MRI.

CLINICAL RELEVANCE/APPLICATION

Current screening modalities including DBT and screening US are proving to result in a very low rate of missed and interval cancers.

RC316

Mitigation of Litigation (Sponsored by the RSNA Professionalism Committee)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S104A

PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Leonard Berlin, MD, Skokie, IL (*Moderator*) Nothing to Disclose
David M. Yousem, MD, Baltimore, MD (*Moderator*) Royalties, Oakstone Publishing, LLC; Author with royalties, Reed Elsevier; Research Grant, Bayer AG; ; ;

LEARNING OBJECTIVES

1) To understand the implications of the four components of a medical negligence case: a. duty to the patient, b. breach in the standard of care, c. causation between breach and harm, and d) damages (economic, pain and suffering, punitive). 2) To reflect on the patient and physician experience in going through a malpractice trial. 3) To apply practice habits that reduce the chance that you will be the subject of a medical malpractice suit, enhance patient safety, increase the likelihood of good outcomes, and prevent frivolous lawsuits. 4) To learn dos and don'ts once sued. 5) To comprehend the role of medical experts in establishing the standard of care and ensuring an equitable and fair judicial process. 6) To discuss ethics of testifying as expert.

ABSTRACT

A medical malpractice case requires establishing four components of the case: 1) the duty of the physician to the patient, 2) a breach in the standard of care (what a reasonably prudent person would do in a similar situation), 3) the establishment that the breach caused the subsequent harm to the patient, and 4) damages to the patient. Most malpractice cases are won or lost in determining whether a deviation in the standard of care occurred and whether that deviation truly caused the patient's damages. Expert witnesses are commonly employed to help establish the standard of care for the setting in question, although some experts also provide guidance as to the expected economic costs that will be incurred by the damaged plaintiff. Because of the high cost of medicolegal litigation, most cases that have minor damages never come to court but may be dropped or settled out of court. because of the vagaries of a lay jury, many substantive cases are also settled out of court.One can reduce the chances that one will be sued by being cognizant of professional standards and guidelines that dictate certain behaviors such as timeliness of reporting, communication of important/relevant/critical/unexpected findings, and establishing good peer review systems that identify errors before they occur. Applying behaviors or work habits that enhance accuracy and efficiency and good practice patterns while also developing good physician-patient relationships are helpful for mitigation of litigation.Effective expert witnesses can help a lay jury understand the nuances of a case and establishing whether negligence has occurred. The credibility of expert witnesses is enhanced when they are impartial, do blinded unbiased reads, understand the specific practice patterns in which the defendant physicians are employed, and can explain complex issues to non-medical jury members.

Sub-Events

RC316A Elements of Legal Suits: Duty, Breech, Causation, Damages and the Links between Them

Participants
Rosemary Schnall, Philadelphia, PA (*Presenter*) Stockholder, Johnson & Johnson
Kelly Yousem, JD, Owings Mills, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

The purpose of this presentation is to understand the main elements of a medical malpractice lawsuit. You will gain an understanding of the process as well as the legal reasoning behind litigation objectives. Additionally, we will discuss the standards of proof required and how expert witnesses are a necessary requirement in this process, for both Plaintiffs and Defendants.

RC316B Mitigation of Litigation: What the Radiologist Can Do To Reduce the Risk of Being Named in a Lawsuit

Participants
Michael M. Raskin, MD, JD, Tamarac, FL, (drraskin@bellsouth.net) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the different types of errors radiologists may make. 2) Analyze and compare specific actions to reduce errors. 3) Demonstrate understanding why failure to communicate is one of the greatest problems facing radiologists today. 4) Apply survival strategies to reduce the risk of being named in a lawsuit.

ABSTRACT

Failure to diagnose and failure to communicate are the two most frequent reasons why a radiologist is named in a lawsuit. Perception and interpretation errors will be analyzed and specific actions to reduce these errors will be compared. The communication of unexpected findings directly impacts on the ability of the radiologist to deliver quality patient care. The courts have consistently held that timely communication may be as important as the diagnosis itself. Radiology is so advanced in imaging technology but not in communicating imaging findings. Specific examples of communication errors will be discussed and analyzed. Potential solutions involving closed-loop communication will be addressed. Finally, a plan for implementation of specific strategies will be suggested.

RC316C Expert Witness Testimony: Ethics and Qualifications for Being an Expert Witness

Participants
Ronald L. Eisenberg, MD, JD, Boston, MA, (rleisenb@bidmc.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the role of an expert witness in malpractice lawsuits and ethical issues to consider to become a more effective and valuable expert witness.

ABSTRACT

Expert witnesses play essential roles in malpractice lawsuits. Radiologists considering becoming expert witnesses need to clearly understand that their duty is to provide honest opinions on technical issues to educate members of the jury so that they can render a more accurate verdict, rather than being advocates for the party that engaged them.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Ronald L. Eisenberg, MD, JD - 2012 Honored Educator
Ronald L. Eisenberg, MD, JD - 2014 Honored Educator

RC317

PET-MR/Hyperpolarized MR

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S504CD

MR NM BQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Heike E. Daldrup-Link, MD, Palo Alto, CA (*Moderator*) Nothing to Disclose

Sub-Events

RC317A Hyperpolarized 13C MR-A Complementary Method to PET for Imaging in Vivo Metabolism

Participants
Daniel M. Spielman, PhD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Assess the basic principles of hyperpolarized 13C MRS, including sample preparation, image acquisition, and data analysis. 2) Differentiate metabolic parameters measurable by hyperpolarized 13C MRS from though obtained with PET. 3) Compare PET versus hyperpolarized 13C MRS sensitivities, spatial resolution, and temporal resolution.

RC317B PET/MR: Applications in Clinical Imaging

Participants
Karin A. Herrmann, MD, PhD, Cleveland, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand technical limitations, workflow and current challenges of PET/MR compared to PET/CT. 2) To learn about most successful applications of PET/MR in clinical practice. 3) To be informed about the incremental value of PET/MR over current imaging strategies in selected clinical scenarios. 4) Identify appropriate clinical indications for PET/MR in current clinical practice. 5) Understand and manage procedural and logistic challenges of PET/MR.

RC317C The Emerging Clinical Role of Hyperpolarized ^{13}C MR in Prostate Cancer Imaging

Participants
John Kurhanewicz, PhD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the clinical need and biochemical rationale for the use of hyperpolarized [1-13C] pyruvate for prostate cancer imaging. 2) Demonstrate a multi-hyperpolarized probe approach for simultaneously measuring prostate cancer metabolism and tumor micro-environment. 3) Demonstrate the utility of hyperpolarized 13C MR for measuring prostate cancer aggressiveness and response to therapy. 4) Demonstrate the safety, clinical feasibility, sensitivity and resolution, and future availability of clinical hyperpolarized 13C MR.

RC318

Interactive Quiz Cases in Neuro-oncologic Imaging (An Interactive Session)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: E352

NR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC318A Spine

Participants
James C. Anderson, MD, Portland, OR (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review imaging of tumors of the spine. 2) Identify aspects of spinal tumors that affect staging, treatment and management 3)Highlight roles of various imaging modalities.

ABSTRACT

Review imaging of tumors of the spine Review aspects of spinal tumors that affect staging, treatment and management Review roles of various imaging modalities

RC318B Head and Neck/ENT

Participants
Suresh K. Mukherji, MD, Northville, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review common head and neck tumors. 2) Identify pertinent imaging findings that show how imaging affects staging. 3) Highlight specific imaging findings that will affect staging, treatment and management.

ABSTRACT

Review common tumors of the head and neck Review imaging findings in head and neck malignancies that specifically change staging Review the value of imaging in directly affecting managemement and treatment

RC318C Brain

Participants
Megan K. Strother, MD, Nashville, TN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify basic anatomic, pathologic, and physiologic principles as they apply to neuro-oncologic imaging of the brain.

ABSTRACT

Five interactive neuro-oncologic cases will be presented in an interactive format. Participants will review basic knowledge and skills that are relevant to the clinical practice of neuroradiology, while evaluating the results of the latest research in neuro-oncologic imaging.

RC320

Confluence of Diagnostic Radiology and Radiation Oncology in Management of Pediatric Malignancies

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S403A

NR MR RO PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Stephanie A. Terezakis, MD, Baltimore, MD (*Moderator*) Speaker, Elekta AB

Sub-Events

RC320A Supratentorial CNS Tumors

Participants
Stephanie M. Perkins, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Tina Y. Poussaint, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the common supratentorial brain tumors of childhood. 2) Evaluate the imaging features of supratentorial brain tumors.

ABSTRACT

The most common type of solid tumor among children is the pediatric brain tumor, which is the second most frequent childhood malignancy after leukemia, and the leading cause of death from solid tumors in this population. Among children aged 0-19, the incidence rate for all primary brain and central nervous system tumors was roughly 5.3 per 100,000, with approximately 4350 cases of new cases of childhood primary malignant and non-malignant CNS tumors were expected to be diagnosed each year in the United States in 2013.Supratentorial tumors are most common in the first 2-3 years of life and in children older than 10 years, supratentorial and infratentorial are of equal frequency. This lecture will focus on the standard and advanced MR imaging features of the common supratentorial tumors of childhood affecting the cerebral hemispheres, suprasellar/sellar regions and pineal regions.

RC320B Infratentorial Central Nervous System Tumors

Participants
David B. Mansur, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Thierry Huisman, MD, Baltimore, MD, (thuisma1@jhmi.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the types of diagnostic imaging most useful in the management of infratentorial CNS tumors. 2) Describe how proper diagnostic imaging aids in target delineation, staging, and treatment planning in posterior fossa CNS radiotherapy. 3) Define how conventional and advanced neuroimaging may characterize and differentiate brain neoplasms from treatment-related imaging findings following radiotherapy.

ABSTRACT

The radiotherapeutic management of infratentorial CNS tumors requires close collaboration between neuroradiology and radiation oncology. This process begins with accurate initial tumor description and delineation in the pre-operative setting. Detection of drop metastases is another critical role for neuroimaging which can be done either preoperatively or post operatively. Post-operative imaging is essential to assist with determining extent of resection as well as defining radiotherapy treatment volumes. Finally, neuroimaging after radiotherapy can aid in determining benign radiation therapy changes from recurrent or progressive tumor.

RC320C Pediatric Sarcomas: MR Imaging

Participants
Oren Cahlon, Princeton, NJ (*Presenter*) Investor, ProCure Treatment Centers, Inc
Laura M. Fayad, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Examine the roles MRI plays in the evaluation of pediatric sarcomas. 2) Assess the utility of various imaging sequences for the initial assessment and post-treatment follow-up of sarcomas. 3) Apply anatomic, functional and metabolic techniques for the identification of tumor extent and character.

ABSTRACT

MRI plays a critical role in the assessment of pediatric musculoskeletal tumors, both osseous and soft tissue masses. Although such neoplasms may initially be evaluated on other modalities, such as sonography or radiography, the most salient role for MRI is in determining the extent of disease. MRI sequences also offer information for tumor detection, characterization, the assessment of treatment response and the distinction of post-operative scar from recurrence. With conventional MRI, excellent anatomic detail is obtained, but with the advent of non-contrast chemical shift imaging, diffusion weighted imaging and MR spectroscopy, functional and metabolic features of a neoplasm can be evaluated noninvasively. In this presentation, a comprehensive MRI approach to assessing pediatric musculoskeletal tumors will be reviewed, focusing on the roles of anatomic, functional and metabolic MRI sequences.

RC321

Medical Physics 2.0: Computed Tomography

Tuesday, Dec. 1 8:30AM - 10:00AM Location: N229

CT PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ehsan Samei, PhD, Durham, NC (*Director*) Nothing to Disclose
Douglas E. Pfeiffer, MS, Boulder, CO (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the current recommendations for computed tomography testing and quality control. 2) To understand impact of accreditation and regulation on CT quality assurance. 3) To understand current dosimetry and dose-reporting considerations.

ABSTRACT

Many organizations have contributed to the methodology for testing computed tomography scanners. These have included state regulatory agencies, the Food and Drug Administration, the American Association of Physicists in Medicine, and the American College of Radiology, among many other groups and individuals. These contributions have included many good ideas, but also much confusion as to what is required. Further, the complexity of modern CT scanners has rendered some tests obsolete or difficult to implement. This presentation focuses mainly on the testing delineated by the 2012 American College of Radiology Computed Tomography Quality Control Manual and that required under the Intersocietal Accreditation Commission. Recommended and required tests will be identified but not described in detail.

Sub-Events

RC321A Computed Tomography Perspective

Participants
Mahadevappa Mahesh, MS, PhD, Baltimore, MD (*Presenter*) Author with royalties, Wolters Kluwer nv

LEARNING OBJECTIVES

1) To reflect on MDCT technology enabling volumetric data acquisition. 2) To evaluate new innovations enabling dose reductions in CT.

ABSTRACT

This talk will provide brief overview on the innovations that has led to the development of CT technology (single slice (SDCT) to multiple slices (MDCT)). Past decade saw the rapid evolution in the capability to obtain multiple slices per gantry rotation (4-320 slices). Having achieved the capability to acquire volumetric data (covering entire cardiac anatomy in half of gantry rotation), the race is currently towards acquiring CT images at optimal radiation dose. Volume CT, dual energy CT, Iterative reconstruction, quantitation are some of the new challenges that will be discussed in this talk.1. CT Technology1a. MDCT detector configuration1b. Volume CT - Wide detector and dual source CT2. New Challenges2a. Iterative reconstruction2b. Dual energy2c. Dose check

RC321B Computed Tomography 1.0

Participants
Douglas E. Pfeiffer, MS, Boulder, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the current recommendations for computed tomography testing and quality control. 2) To understand impact of accreditation and regulation on CT quality assurance. 3) To understand current dosimetry and dose-reporting considerations.

ABSTRACT

Many organizations have contributed to the methodology for testing computed tomography scanners. These have included state regulatory agencies, the Food and Drug Administration, the American Association of Physicists in Medicine, and the American College of Radiology, among many other groups and individuals. These contributions have included many good ideas, but also much confusion as to what is required. Further, the complexity of modern CT scanners has rendered some tests obsolete or difficult to implement. This presentation focuses mainly on the testing delineated by the 2012 American College of Radiology Computed Tomography Quality Control Manual and that required under the Intersocietal Accreditation Commission. Recommended and required tests will be identified but not described in detail.

RC321C Computed Tomography 2.0

Participants
Ehsan Samei, PhD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To become familiar with the major new developments of physics support for clinical CT operations. 2) To understand the need and the definitions of the new CT performance metrics for dose and quality. 3) To understand the testing implications of new CT technologies. 4)To understand the need for operational optimization of CT systems.

ABSTRACT

RC322

Proton: Imaging for Treatment Planning

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S102D

RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Jon J. Kruse, PhD, Rochester, MN (*Moderator*) Research Grant, Varian Medical Systems, Inc

ABSTRACT

Proton therapy has the potential to deliver very conformal dose distributions which may lead to higher cure rates or lower treatment toxicities than conventional or intensity modulated x-ray therapy. Like modern photon modalities, proton therapy relies heavily on advanced imaging techniques for treatment planning and dose calculation. This course will describe imaging requirements which are unique to proton therapy treatment planning. Much of the advantage of proton therapy is derived from the particle beam's finite range, and calculation of proton range within a patient requires a conversion between CT Hounsfield Units (HU) and proton stopping power. This calibration process is significantly different from the HU to electron density conversion which is performed for x-ray dose calculation. Uncertainties in the stopping power conversion are currently managed by expanding normal tissue margins around the clinical target volume and through appropriate beam selection. Improved CT techniques and alternative imaging modalities promise to deliver a more reliable image of stopping power within the patient, allowing for reduced treatment volumes. Tumor motion also presents a unique challenge in proton therapy, as a moving target exhibits not only variable position within a beam's eye view, but varying range as well. Modern proton therapy facilities which deliver treatments via a scanning beam are additionally susceptible to the interplay effect, in which the time dependent dose delivery is altered by motion of the target and surrounding anatomy. Four-dimensional imaging and dose calculation are then critically important in proton therapy to ensure that the treatment plan is robust against tumor motion.

Sub-Events

RC322A Imaging Considerations for Proton Treatment Planning

Participants
Andrew Wroe, PhD, Loma Linda, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the stoichiometric calibration technique for deriving proton stopping power from CT Hounsfield Units. 2) Identify common sources of uncertainty in the predicted proton range within a patient. 3) Explain near- and long-term developments in CT imaging and alternative modalities which may reduce the uncertainty in proton range calculation.

RC322B Uncertainties in Motion for Treatment Planning

Participants
Heng Li, Houston, TX (*Presenter*) Research funded, Varian Medical Systems, Inc

LEARNING OBJECTIVES

1) Describe the impact of tumor motion on a proton dose distribution. 2) Compare the relative value of various four-dimensional imaging modalities in the evaluation of a proton plan for a mobile target. 3) Explain the process for incorporating four-dimensional imaging into dose calculation.

RC323

Molecular Imaging Mini-Course: Clinical Applications of Molecular Imaging - Neuro

Tuesday, Dec. 1 8:30AM - 10:00AM Location: N226

NR MI RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC323A Oncology Applications

Participants
Hyunsuk Shim, PhD, Atlanta, GA, (hshim@emory.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn about the potential of combining an advanced MR spectroscopic imaging with standard MR images to reduce the recurence rate in glioblatomas.

ABSTRACT

Radiation therapy (RT) is as good as the images that guide RT planning. RT based on conventional MRIs may not fully target tumor extent in glioblastomas (GBM), which may, in part, account for high recurrence rates (60-70 percent at 6 months). Magnetic resonance spectroscopic imaging (MRSI), a molecular imaging modality that quantifies endogenous metabolite levels without relying on perfusion, leakage and diffusion of injected material, may better define extent of actively proliferating tumor. In addition, advances in this technology now permit acquisition of full-brain high-resolution 3D MRSIs in 12-14 minutes. We correlated state-of-the-art MRSI metabolite maps with tissue histopathology to validate further its use for identifying tumor that may not be fully imaged by conventional MRI sequences and provide support for its adjunctive use in tumor contouring for RT planning. Integration of histologically-verified, whole brain 3D MRSI into RT planning is feasible and may considerably modify target volumes. Thus, RT planning for GBMs may be augmented by MRSI potentially leading to reduced recurrence rates.

RC323B Functional Applications

Participants
Satoshi Minoshima, MD, PhD, Salt Lake City, UT (*Presenter*) Royalties, General Electric Company; Consultant, Hamamatsu Photonics KK; Research Grant, Hitachi, Ltd; Research Grant, Nihon Medi-Physics Co, Ltd; Research Grant, Astellas Group; Research Grant, Seattle Genetics, Inc;

RC324

Reviewing Manuscripts for the RSNA Journals (Sponsored by the RSNA Publications Council)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: E260

OT PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Herbert Y. Kressel, MD, Boston, MA (*Moderator*) Royalties, Bayer AG
Jeffrey S. Klein, MD, Burlington, VT, (jklein@rsna.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the similarities and differences in the peer review process for the RSNA journals. 2) Discuss the functions of the reviewer in the peer review process. 3) Enumerate the desired elements for peer review of a manuscript 4) Detail how a reviewer can receive AMA PRA Category 1 CME credit for manuscript review

ABSTRACT

Peer review is, in a major way, responsible for the quality of the manuscripts published in a given journal. In this refresher course, the Editors of both of the peer-reviewed journals published by the RSNA will discuss the peer review processes of their respective journals. The Editors will also emphasize the important functions served by the peer reviewers and will indicate the types of information which they would like the peer reviewers to consider when the peer reviewers review a given manuscript. Benefits and responsibilities of the peer review process will be detailed. There will be ample time for questions and answers.

URL

RC325

Quantitative Imaging Mini-course: Modality Independent Issues

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S502AB

BQ CT PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Director*) Institutional research agreement, Siemens AG; Research support, Siemens AG; ; ; ; ;

Sub-Events

RC325A The Role of Physical Phantoms in Quantitative Imaging

Participants
Paul E. Kinahan, PhD, Seattle, WA (*Presenter*) Research Grant, General Electric Company; Co-founder, PET/X LLC

LEARNING OBJECTIVES

1) To understand the definitions and requirements of quantitative medical imaging. 2) To learn the role of phantoms and tradeoffs in comparison with simulations and patient studies. 3) To review the classes of phantoms available: Commercial, experimental, and virtual (digital reference objects).

ABSTRACT

RC325B Digital Reference Objects

Participants
Daniel P. Barboriak, MD, Durham, NC (*Presenter*) Advisory Board, General Electric Company

LEARNING OBJECTIVES

1) Explain why digital reference objects are useful for evaluation of software packages used to derive quantitative imaging biomarkers. 2) State the difference between bias and precision, and describe how aggregate and disaggregate measures of software performance differ.

ABSTRACT

This lecture will familiarize the audience with digital reference objects (DROs) and their place in the development of quantitative imaging biomarkers (QIBs).To determine whether a quantitative imaging study is measuring a pathological or physiological process in an unbiased way, the quantitative imaging result would need to be compared to an independently ascertained unbiased measurement in the imaged subject or animal. Unfortunately, obtaining a precise and unbiased measurement (also known as ground truth) is generally impractical or impossible.Frequently there are several software packages that can be used to create maps reflecting the spatial distribution of the QIB. Because different software packages often give different quantitative results, the choice of software contributes to the variability of the result. Without ground truth data, it can be difficult to determine which softwares calculate the underlying biomarker with sufficient precision and lack of bias to be applicable for a particular use case.DROs are synthetic images whose pixel values are partially or completely determined by mathematical equations. Although these images may be designed to mimic real imaging data, their content is ultimately determined by mathematical models. Even though DROs do not perfectly simulate real data, they are useful because they are created assuming particular underlying parameter values, which can be regarded as ground truth for these objects.DROs can be particularly valuable for evaluation of software packages. Because they are created using known ground truth, they can be used to determine whether a particular image analysis strategy introduces biases when used to extract a QIB. (This is not possible with real data if the ground truth is not known). Assuming that realistic image noise and/or artifact can be included in the DRO, they can also be used to estimate how precisely a software package is deriving quantitative metrics in real images.This lecture will describe how DROs are used in the RSNA Quantitative Imaging Biomarker Alliance (QIBA) process. Topics that will be discussed include: 1) the variety of metrics that can be used to evaluate software performance with DROs; 2) the differences between aggregated and disaggregated measures of performance, and the relevance of this for determining whether software complies with a standard; and 3) best practices for creation of DROs.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Daniel P. Barboriak, MD - 2013 Honored Educator

RC325C CT Image Analysis and Sources of Variation

Participants
Binsheng Zhao, DSc, New York, NY (*Presenter*) License agreement, Varian Medical Systems, Inc; License agreement, Keosys SAS; License agreement, Hinacom Software and Technology, Ltd; License agreement, ImBio, LLC; License agreement, AG Mednet, Inc

LEARNING OBJECTIVES

1) To familiarize the audience with the basic image analysis methods such as segmentation and feature extraction, using tumor

quantification in oncology as an example. 2) To discuss sources of variation in image analysis, using both phantom and in-vivo tumors as examples. 3) To raise awareness of the need for harmonization of imaging and quantification techniques in quantitative radiology.

RC327

Clinical Decision Support and Utilization Management: Preparing for the CMS 2017 Mandate

Tuesday, Dec. 1 8:30AM - 10:00AM Location: E451A

HP

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Keith J. Dreyer, MD,PhD, Boston, MA (*Coordinator*) Co-Chairman, Medical Advisory Board, Merge/IBM
Keith J. Dreyer, MD,PhD, Boston, MA (*Moderator*) Co-Chairman, Medical Advisory Board, Merge/IBM
Jeffrey B. Weilburg, MD, Boston, MA (*Presenter*) Nothing to Disclose
Mark D. Hiatt, MD, MBA, Salt Lake City, UT, (mark.hiatt@regence.com) (*Presenter*) Medical Director, Regence BlueCross BlueShield; Board Member, RadSite ; Former Officer, HealthHelp, LLC
Joseph Hutter, Baltimore, MD (*Presenter*) Nothing to Disclose
Jennifer K. Coleman, Traverse City, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Explain the need for assuring the appropriateness of ordered exams. 2) Know the role of utilization management in reducing inappropriate and unnecessary tests. 3) Identify the advantages and limitations of clinical decision support. 4) Recognize how payers are considering meeting the CMS mandate for pre-order decision support.

ABSTRACT

This course will discuss the 2017 CMS mandate for pre-order decision support for MRI, CT, and PET, including the need for assuring the appropriateness of ordered exams, the roles of utilization management and clinical decision support in reducing inappropriate and unnecessary tests, the advantages and limitations of methods to manage utilization, and how payers are considering meeting the CMS mandate for pre-order decision support.

URL

https://www.federalregister.gov/articles/search?conditions%5Bregulation_id_number%5D=0938-AS40

RC329

Characterization of Complex and Sonographically Indeterminate Adnexal Masses (An Interactive Session)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: E353B

GU MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC329A Overview of the Clinical Indications for Using MRI

Participants
Andrea G. Rockall, MRCP, FRCR, London, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To be familiar with the typical clinical presentation of adnexal masses. 2) To understand the role role of ultrasound in the initial evaluation and diagnosis of adnexal masses. 3) To know the current indications for MRI in the characterisation of adnexal masses.

ABSTRACT

Clinical presentation of adnexal masses can be due to symptoms (such as acute or chronic pelvic pain or sepsis) or may be incidental. Ultrasound is the initial investigation in almost every case, although CT may be used initially in patients presenting with an acute abdomen. Ultrasound features that can differentiate benign from malignant adnexal masses are well defined and over 80% of cases can be confidently characterised on the basis of ultrasound findings. However, when the nature of a mass is indeterminate on ultrasound, MRI can be useful in further characterisation of the mass. This can be particularly useful in cases where fertility preservation is of paramount importance or where the risks of surgery are high due to other co-morbidities. This lecture will include a full discussion of the current indications for MRI in characterisation of adnexal masses.

RC329B Review of Scoring System for Complex and Sonographically Indeterminate Adnexal Masses (The RULES)

Participants
Isabelle Thomassin-Naggara, MD, Paris, France (*Presenter*) Speakers Bureau, General Electric Company; Research Consultant, Olea Medical

LEARNING OBJECTIVES

1) To learn how to optimise the MRI protocol and how to improve the characterisation of indeterminate complex adnexal masses. 2) To understand the added value of functional sequences (DCE MRI and DWI) in diagnosing adnexal masses. 3) To present a novel diagnostic score named ADNEX MR score for classified adnexal masses using MR imaging according to their positive predictive value.

ABSTRACT

For complex adnexal masses, MR imaging add to conventional criteria of malignancy common to all imaging modalities (bilaterality, tumor diameter larger than 4 cm, predominantly solid mass, cystic tumor with vegetations, and secondary malignant features, such as ascites, peritoneal involvement, and enlarged lymph nodes) specific features based on the characterization of the solid tissue (including vegetation, thickened irregular septa and solid portion) of the adnexal tumor. Using ADNEX MR-SCORING system for adnexal masses, areas under the curve for diagnosis of malignancy is high both for experienced and junior reader (AUCR1/R2=0.980/0.961). A score is 4 or greater is associated with malignancy with a sensitivity of 93.5% (58/62) and specificity of 96.6% (258/267), the risk of malignancy is high, and the patient should be referred to a cancer center. When the diagnostic score is 3 or less, the association with malignancy is minimal and the patient may benefit from more imaging follow-up or conservative treatment. Finally, if the diagnostic score is 2, the mass has a very low risk to be malignant (<2%). This new MR diagnosis classification will be detailed with interactive clinical cases during this session

RC329C Interactive Cases

Participants
Elizabeth A. Sadowski, MD, Madison, WI (*Presenter*) Nothing to Disclose
Isabelle Thomassin-Naggara, MD, Paris, France (*Presenter*) Speakers Bureau, General Electric Company; Research Consultant, Olea Medical

LEARNING OBJECTIVES

1) Develop a method for classifying adnexal masses on MRI by assessing their signal characteristics and enhancement patterns. 2) Assess the risk of ovarian cancer based on the MRI appearance of an adnexal lesion and clinical information. 3) Emphasize the role of MRI in the evaluation of adnexal lesions.

ABSTRACT

ABSTRACT There is a spectrum of ovarian neoplasms ranging from benign to malignant. Identifying the MR imaging features suggestive of benign versus worrisome lesions can help appropriately triage adnexal lesions into follow up versus surgical consultation. The purpose of the interactive session is to review the imaging features of benign and worrisome adnexal lesions on MRI and to discuss the appropriate follow up in each case.

RC332

Aligning Incentives Along the Imaging Value Chain

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S102C

HP LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Geraldine B. McGinty, MD,MBA, New York, NY (*Presenter*) Nothing to Disclose
Richard Duszak JR, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Giles W. Boland, MD, Boston, MA (*Presenter*) Principal, Radiology Consulting Group; Royalties, Reed Elsevier

LEARNING OBJECTIVES

1) To understand value-focused healthcare imperatives in the evolution of healthcare delivery systems and how they impact medical imaging. 2) To implement practice changes aligned with Imaging 3.0 so as to maximize the relevance of radiology and radiologists in ongoing health system changes. 3) To improve the delivery of imaging care by focusing on value chain opportunities. (This course is part of the Leadership Track)

ABSTRACT

Although radiology's dramatic evolution over the last century has profoundly affected patient care for the better, our current system is fragmented with many providers focusing more on technology and physician needs rather than what really matters to patients: better value and outcomes. This latter dynamic is aligned with current national health care reform initiatives and creates both challenges and opportunities for radiologists to find ways to deliver new value for patients. The American College of Radiology has responded to this challenge with the introduction of Imaging 3.0, which represents a call to action to all radiologists to assume leadership roles in shaping America's future health care system through 5 key pillars: imaging appropriateness, quality, safety, efficiency, and satisfaction. That enhanced value will require modulation of imaging work processes best understood through the concept of the imaging value chain, which will be the focus of this course.

RC350

CTA from Head to Toe

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S404AB

CA CT VA IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Alison Wilcox, MD, Los Angeles, CA (*Moderator*) Speaker, Toshiba Corporation

Sub-Events

RC350A Cardiac CT- Pre, Peri and Post Procedural Management

Participants
Cameron Hassani, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review pre-procedural patient preparation including appropriate patient selection, beta blockade, contraindications and alternatives to beta blockers 2) Discuss how to manage non-standard scenarios (atrial fibrillation, pacemaker, young adults) 3) Peri-procedural issues including vasodilation, continued heart rate control, and breathholding requirements. 4) Image acquisition including radiation dose reduction techniques, technique choice, and post CABG patient. 5) Postprocedural complications include contrast reactions and their management.

ABSTRACT

Cardiac CTA involve slightly more preparation than the standard CT acquisition. Heart rate control is the most important aspect that needs to be addressed prior to the patient arriving in the radiology department. Periprocedural issues mostly involved how to optimize technique while having the lowest radiation dose especially in the new age of dose reduction. Almost as important as heart rate management is how to treat postprocedural complications especially contrast reactions. This presentation will discuss these aspects and include treatment options as well as their alternatives.

RC350B TEVAR/EVAR- Pre, Post and Periprocedural Evaluation

Participants
Alison Wilcox, MD, Los Angeles, CA (*Presenter*) Speaker, Toshiba Corporation

LEARNING OBJECTIVES

1) What are some clinical indications for acute aortic imaging. 2) What are some CT parameters that can aid in various diagnosis? 3) What are some of common complications seen in TEVAR and EVAR? 4) What are the important measurements and vessel variants that help guide surgical approach. 5) New suggestions for type B management. 6) What are some imaging problems and pitfall and some methods to assist. 7) Briefly discuss TAVR acquisition.

ABSTRACT

The acute aorta is part of a syndrome of diseases affecting the aorta with significant overlap of findings and clinical presentations. Clinically the diagnosis is difficult as there is overlap between patients with suspected coronary disease, pulmonary embolism and acute aortic syndrome. In the past several years, minimally invasive surgery with Thoracic Endovascular Aortic Repair (TEVAR) or Endovascular Aortic Repair (EVAR) have become increasingly popular. The images choices include gated vs non gated studies, non-contrast imaging, and delayed imaging. The literature is mixed on how and when to use these modalities. The complications of these procedures is often complex and subtle as well. Knowledge of these vascular complications is imperative for patient management. In addition, these patients often have significant atherosclerotic disease elsewhere that might be limiting factors for stent placement, including renal insufficiency. Newer scanners and imaging techniques can reduce radiation dose, and limit the amount of contrast delivery to preserve renal function while preserving image quality. TAVR is an example of another minimally invasive technique gaining popularity that has imaging challenges. Again, newer scanning techniques with limited contrast delivery can provide excellent image quality while limiting radiation dose and preserving renal function.

RC350C Peripheral CTA-A How-to

Participants
Ilya Lekht, MD, los angeles, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Enhance knowledge of normal and abnormal coronary and cardiac anatomy, with an emphasis on differentiating benign from significant variants. 2) Demonstrate the spectrum of nonatherosclerotic congenital and acquired diseases that may affect the coronary arteries. 3) Demonstrate the spectrum of non-atherosclerotic congenital and acquired diseases that may affect the heart.

ABSTRACT

A variety of non-atherosclerotic conditions are detectable on cardiac CT scans, including diseases of the heart, and disease processes which may affect the coronary arteries, or other vascular structures. Cardiac CT has a number of unique advantages in detecting non-atherosclerotic conditions, including congenital and acquired diseases. The focus of this presentation will be non-atherosclerotic conditions of the coronary arteries and of the heart. Variants of normal and abnormal anatomy of the coronary arteries will be discussed, including tips for identifying when coronary anatomic variants are significant. Acquired, non-atherosclerotic diseases of the coronary arteries will also be discussed. This presentation will also discuss the spectrum of non-

atherosclerotic diseases of the heart which may be detected at cardiac CT, including congenital and acquired valvular and cardiac diseases. At the end of this exhibit, the viewer will have a better appreciation for abnormal coronary and cardiac anatomy and the broad spectrum of non-atherosclerotic cardiovascular diseases which may be seen at cardiac CT.

RC351

Pelvic MRI in Oncology: Pearls for Practice

Tuesday, Dec. 1 8:30AM - 10:00AM Location: E350

GU MR OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC351A Practical Approach to Understanding Gene Mutations with Interpretation of Imaging in Gynecologic Malignancy

Participants
Priya R. Bhosale, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn the gentic mutations present in Endomtrial and Ovarian Cancer. 2) Pathogenesis of Ovarian Cancer. 3) Implications on image interpretation.

ABSTRACT

Endometrial cancer is teh most common female gynecologic malignancy.Epithelial ovarian cancer is the most common cause of gynecological cancer death in the United States. More recently epithelial ovarian tumors have been broadly classified into two distinct groups. The type I tumors have low grade serous, clear cell, endometrioid, and mucinous histological features. Typically, these tumors are slow growing and confined to the ovary, and are less sensitive to standard chemotherapy. BRAF and KRAS somatic mutations are relatively common in these tumors, which may have important therapeutic implications. Type II tumors are high grade serous cancers of the ovary, peritoneum, and fallopian tube. These tumors are clinically aggressive and are often widely metastatic at the time of presentation. We will discuss the gene mutations associated with different endometrial and epithelial ovarian cancer, pathogenesis, implications on therapy and imaging.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Priya R. Bhosale, MD - 2012 Honored Educator

RC351B Pearls and Pitfalls in Prostate MRI

Participants
Aradhana M. Venkatesan, MD, Houston, TX, (avenkatesan@mdanderson.org) (*Presenter*) Institutional research agreement, Koninklijke Philips NV

LEARNING OBJECTIVES

1) List the elements of common prostate MRI acquisition protocols, defining the roles for each pulse sequence in prostate cancer detection. 2) List imaging findings critical to accurate prostate cancer detection and staging. 3) Identify imaging pitfalls in the detection and staging of prostate cancer. 4) Describe common MRI findings of treated prostate cancer. 4) List the elements of the Prostate Imaging-Reporting and Data System (PI-RADS) structured reporting scheme. 5) List the updated changes reflected in the most recent PI-RADSv2 structured reporting scheme.

ABSTRACT

Prostate cancer is one of the most frequently diagnosed cancers in the male population. It is the second most common type of cancer detected in American men and their second leading cause of cancer death. The proposed refresher course will provide an overview of MRI for prostate cancer imaging, including a discussion of salient imaging findings on multi-parametric MRI, pitfalls in imaging interpretation, and an overview of existing standardized reporting templates for prostate MR interpretation.

RC351C How to Perform and Interpret MRI of the Bladder and Urethra: Anatomy, Technique, and Applications

Participants
Mukesh G. Harisinghani, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) MR techniques to image the bladder and urethra will be discussed. 2) Pointers for optimal MR evaluation will be discussed. 3) Pointers for accurate diagnosis on MRI will be discussed.

ABSTRACT

The propsed course will be provide an overview of applying MR for imaging the bladder and uretheral region

RC352

Carotid and Renal Doppler (Hands-on)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: E264

GU VA US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Gowthaman Gunabushanam, MD, New Haven, CT, (gowthaman.gunabushanam@yale.edu) (*Moderator*) Editor, WebMD Health Corp ;
Gowthaman Gunabushanam, MD, New Haven, CT, (gowthaman.gunabushanam@yale.edu) (*Presenter*) Editor, WebMD Health Corp ;
Mark E. Lockhart, MD, Birmingham, AL, (mlockhart@uabmc.edu) (*Presenter*) Nothing to Disclose
Shweta Bhatt, MD, MBBS, Rochester, NY (*Presenter*) Nothing to Disclose
Wui K. Chong, MD, Chapel Hill, NC, (wk_chong@med.unc.edu) (*Presenter*) Nothing to Disclose
Corinne Deurdulian, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Vikram S. Dogra, MD, Rochester, NY (*Presenter*) Editor, Reed Elsevier
Edward G. Grant, MD, Los Angeles, CA (*Presenter*) Research Grant, General Electric Company ; Medical Advisory Board, Nuance Communications, Inc
Ulrike M. Hamper, MD, MBA, Baltimore, MD (*Presenter*) Nothing to Disclose
Felix A. Hester, Helena, AL (*Presenter*) Nothing to Disclose
Michelle L. Robbin, MD, Birmingham, AL, (mrobbin@uabmc.edu) (*Presenter*) Consultant, Koninklijke Philips NV;
Leslie M. Scoutt, MD, New Haven, CT (*Presenter*) Consultant, Koninklijke Philips NV
Ravinder Sidhu, MD, Rochester, NY, (ravinder_sidhu@urmc.rochester.edu) (*Presenter*) Nothing to Disclose
Sadhna Verma, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose
Margarita V. Revzin, MD, Wilton, CT, (margarita.revzin@yale.edu) (*Presenter*) Nothing to Disclose
Davida Jones-Manns, Hampstead, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the technique and optimally perform carotid Doppler ultrasound. 2) Describe the technique and optimally perform renal Doppler ultrasound. 3) Review qualitative and quantitative criteria for diagnosing abnormalities in carotid and renal ultrasound Doppler examinations.

ABSTRACT

This hands-on course will provide participants with a combination of didactic lectures and an extended 'live' scanning opportunity on normal human volunteers, as follows: Didactic lectures (30 minutes): 1. Carotid Doppler Ultrasound: scanning technique, diagnostic criteria and interesting teaching cases. 2. Renal Doppler Ultrasound: scanning technique, diagnostic criteria and interesting teaching cases. Mentored scanning (60 minutes): Following the didactic lectures, the participants will proceed to a scanning area with normal human volunteers and ultrasound machines from different manufacturers. Participants will be able to perform live scanning with direct assistance (if needed) by faculty. Faculty will be able to offer feedback, help participants improve their scanning technique as well as answer any questions. Faculty will also be available to answer general questions relating to all aspects of vascular Doppler, not limited to carotid and renal Doppler studies.

Honored Educators

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Leslie M. Scoutt, MD - 2014 Honored Educator
Sadhna Verma, MD - 2013 Honored Educator

RC353

Tools and Use Cases for Text Information Extraction in Radiology

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S403B

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Paras Lakhani, MD, Philadelphia, PA, (Paras.lakhani@jefferson.edu) (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Place natural language processing (NLP) in context of the history of radiology reporting. 2) Review how NLP is used in disciplines outside of radiology. 3) Understand basic NLP methods. 4) Assess the applicability of NLP to radiology reports.

ABSTRACT

Natural Language Processing (NLP) refers to the automated extraction of meaningful information from narrative text. Some NLP systems use simple rules to categorize text according to whether a particular concept may be present. More sophisticated systems use part-of-speech tagging and grammatical parsing to extract concepts and relationships from text. Some NLP systems use statistical approaches that can learn to categorize text automatically based on a test set of positive and negative examples. When applied to radiology reports, NLP systems are most frequently used to identify and retrieve reports of interest, such as reports containing a critical result, an incidental finding, or a recommendation for follow up. NLP systems are simpler to construct and more accurate when the structure of the analyzed text is constrained in some manner. Several real-world examples of both simple and sophisticated NLP systems in radiology will illustrate the spectrum of applicable techniques and the potential benefit to radiology practice.

Sub-Events

RC353A Natural Language Processing to Solve Problems in Clinical Practice

Participants
Michael E. Zalis, MD, Boston, MA (*Presenter*) Co-founder, QPID Health Inc; Chief Medical Officer, QPID Health Inc; Stockholder, QPID Health Inc

LEARNING OBJECTIVES

View learning objectives under main course title. In greater detail: 1) demonstrate gaps of function that exist with current EHR and PACS approaches to handling unstructured data 2) describe general approaches to NLP and assisted reasoning in addressing these gaps, 3) provide some specific examples of novel solutions that address these gaps and improve clinical efficiency.

RC353B The Good, The Bad, and The Ugly: Using Natural Language Processing to Understand Information Content in Radiology Reports

Participants
Brian E. Chapman, PhD, Salt Lake City, UT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with programming tools that can be used to build simple NLP applications. 2) Understand how the similarities and differences between medical and natural langauge affect natural language processing applications. 3) Understand how these tools can be used to estimate information content and clarity in radiology reports.

RC353C Use Cases in Radiology: Extracting Critical Results and Structured Reporting Using Natural Language

Participants
Paras Lakhani, MD, Philadelphia, PA, (Paras.lakhani@jefferson.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) See a real-world example of an NLP solution used to identify critical radiology results and documentation of communication. 2) Understand logic of text-mining algorithms designed to identify critical test results, and how they can be applied to large databases. 3) Demonstrate results of an NLP system used to identify critical radiology results. 4) Demonstrate how NLP can be used to make structured radiology reports.

ABSTRACT

The Joint Commission requires timely communication of critical results to an appropriate healthcare provider, and the American College of Radiology's Practice Guideline for Communication recommends documentation of communication of critical results in the radiology report. NLP techniques can be used identify radiology reports containing critical results and documentation of communication with high accuracy. Such algorithms may be used for Joint Commission compliance, performance monitoring, and quality assurance initiatives. Examples of specific text-mining algorithms that identify critical results will be provided. Also, the process of validating and determining the effectiveness of such algorithms using precision and recall will be discussed.Structured reporting is felt to have many advantages over free-text reporting, including that it is preferred by clinicians, facilitates data-mining, business analytics, retrospective research, and quantitative imaging. However, traditional SR reporting applications are found to be time-consuming by some radiologists, resulting in decreased productivity. Thus, an NLP solution to automatically create standardized reports from free-text radiology dictations will be demonstrated. Such a solution may provide the benefits of structured reporting with without loss in productivity.

RC353D Navigating the Available Tools and Methods for Natural Language Processing

Participants
Wendy Chapman, PhD, Salt Lake City, UT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review information extraction methods for building rule-based, grammar-based, and machine-learning NLP systems with examples of when to use each. 2) Demonstrate the creation of manually created reference standards against which to measure NLP systems. 3) Present a survey of open-source tools for NLP and manual chart review and how these can be built upon.

ABSTRACT

Natural language processing (NLP) is a term that describes a range of techniques for identifying, understanding, and analyzing information from text. Some of the earliest applications of NLP in medicine were on imaging reports. Attendees will be walked through both simple and complex NLP methods with examples of how and when they are best used in imaging. Several open-source tools will be demonstrated with information provided on how these tools can easily be built upon for customized needs.

RC354

Meaningful Use for Radiology: Pros and Cons

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S404CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ramin Khorasani, MD, Roxbury Crossing, MA (*Moderator*) Consultant, Medicalis Corp
Ramin Khorasani, MD, Roxbury Crossing, MA (*Presenter*) Consultant, Medicalis Corp
Alberto F. Goldszal, PhD, MBA, East Brunswick, NJ, (AGoldszal@UniversityRadiology.com) (*Presenter*) Advisory Board, FUJIFILM Holdings Corporation; Advisory Board, MedInformatix, Inc
Keith D. Hentel, MD, MS, New York, NY, (keh9003@med.cornell.edu) (*Presenter*) Nothing to Disclose
James Whitfill, MD, Scottsdale, AZ (*Presenter*) President, Lumetis, LLC; Co-author, Hitachi, Ltd

LEARNING OBJECTIVES

1) Understand how a radiology practice that was a later adopter of meeting meaningful use criteria has achieved successful results for two years running. 2) Learn about CMS MU audits and the audit process 3) Learn about challenges for meaningful use stage 2 and radiology.

ABSTRACT

RCA31

Learn Image Segmentation Basics with Hands-on Introduction to ITK-SNAP (Hands-on)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Paul Yushkevich, PhD, Philadelphia, PA, (pauly2@upenn.edu) (*Presenter*) Nothing to Disclose
Guido Gerig, Brooklyn, NY (*Presenter*) Nothing to Disclose
Jeffrey Ware, MD, Philadelphia, PA, (jeffrey.ware2@uphs.upenn.edu) (*Presenter*) Nothing to Disclose
Philipose G. Mulugeta, MD, Philadelphia, PA, (philipose.mulugeta@uphs.upenn.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To use a free interactive software tool ITK-SNAP to view and manipulate 3D medical image volumes such as multi-parametric MRI, CT and ultrasound. 2) To label anatomical structures in medical images using a combination of manual and user-guided automatic segmentation tools.

ABSTRACT

Quantitative analysis of medical imaging data is increasingly relevant in a growing number of radiological applications. Almost invariably, such quantitative analysis requires some structures of interest (organs, tumors, lesions, etc.) to be labeled in the image. Labeling anatomical structures is a complex task, particularly when the imaging data is complex, such as in the case of multi-parametric MRI or fusion of different imaging modalities. ITK-SNAP is a free, open-source, and easy to use interactive software tool that allows users to view multiple image volumes of the same anatomy and label structures using information from all volumes concurrently. For example, ITK-SNAP allows users to label tumors (core, edema, necrosis) using a combination of T1-weighted, contrast-enhanced T2-weighted, T2-weighted and FLAIR MRI. ITK-SNAP provides easy to use user-guided automatic segmentation functionality rooted in statistical machine learning and deformable modeling algorithms, as well as built in tools for manual editing and correction of segmentations. ITK-SNAP runs on Windows, MacOS and Linux platforms. During this hands-on course, the participants will use ITK-SNAP to label organs and tumors in various imaging modalities. After completing the course, participants will be well equipped for performing quantitative analyses of medical image data using ITK-SNAP and other compatible free software tools.

Handout:Paul Yushkevich

http://abstract.rsna.org/uploads/2015/15003102/handout_exercises.pdf

RCB31

Creating Radiology eBooks for the iPad (Hands-on)

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S401CD

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Henry J. Baskin JR, MD, Salt Lake Cty, UT (*Presenter*) Nothing to Disclose
Justin Cramer, MD, Salt Lake City, UT (*Presenter*) Nothing to Disclose
Justin La Plante, MD, Sayre, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with Apple's free ebook authoring tool, iBooks Author. 2) Create a sample radiology ebook during the course. 3) Learn how to freely share your ebook with others.

ABSTRACT

The iPad is rapidly becoming the de facto learning tool used by radiology residents and fellows. iBooks Author, a free authoring tool from Apple, enables the creation of ebooks with a near-limitless number of high-resolution images, movies, and other interactive elements. Unfortunately, most radiologists lack the expertise to leverage the advantages of this application. This hands-on workshop will cover the basics of iBooks Author. During the course, attendees will create their own interactive radiology ebook and learn how to freely share it with anyone who has an iPad.iBooks author is only available for Mac OS and bringing your own Mac is required for the hands-on portion of the course. Attendees are encouraged to download iBooks Author prior to attending; the link is provided below. Attendees are also encouraged to come with an idea for their own iBook, ideally with a text file and folder of images they would like to turn into an ebook during the course. Sample text and images will be provided for those who do not bring their own material.

URL

RCC31

The RSNA Image Share Network - How It Operates and How to Put It into Your Office

Tuesday, Dec. 1 8:30AM - 10:00AM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
David S. Mendelson, MD, Larchmont, NY (*Moderator*) Spouse, Employee, Novartis AG; Advisory Board, Nuance Communications, Inc; Advisory Board, General Electric Company; Advisory Board, Toshiba Corporation
Wyatt M. Tellis, PhD, San Francisco, CA (*Presenter*) Officer, EyePACS, LLC

LEARNING OBJECTIVES

1) Understand the goals of the RSNA Image Share project. 2) Understand the technical architecture of the RSNA Image Share. 3) Learn the steps necessary to implement in your local environment.

URL

MSAS32

Economics in Imaging/Business Intelligence (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Tuesday, Dec. 1 10:30AM - 12:00PM Location: S105AB

HP LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
William A. Undie, PhD, RT, Houston, TX (*Moderator*) Nothing to Disclose
Morris A. Stein, BArch, Phoenix, AZ (*Moderator*) Nothing to Disclose

Sub-Events

MSAS32A One Hospital's Experience: Tightening the Belts Using LEAN and Green Methodologies

Participants
Janet Champagne, MBA,RT, Houston, TX, (jlchampa@texaschildrens.org) (*Presenter*) Nothing to Disclose
Alex Koroll, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the value of implementing LEAN and Six Sigma Green Belt tools and processes to improve patient and employee satisfaction. 2) Demonstrate understanding of the seven elements of waste and apply methodologies to eliminate or improve its negative impact in your workflows. 3) Utilizing the Six Sigma processes to gain credibility and demonstrate value within the organization.

MSAS32B Using Evidence Based Design to Increase Operational and Planning Efficiencies

Participants
Carlos L. Amato, Los Angeles, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how to apply evidence based design planning and design principles to improve efficiency and patient satisfaction. 2) Understand how to plan an "intelligent" department that is flexible enough to deal with imaging complex processes and constant technology changes. 3) Understand why good design is good business.

MSCC32

Case-based Review of Nuclear Medicine: PET/CT Workshop-Cancers of the Thorax (In Conjunction with SNMMI) (An Interactive Session)

Tuesday, Dec. 1 10:30AM - 12:00PM Location: S406A

CH CT NM OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Janis P. O'Malley, MD, Birmingham, AL (*Director*) Nothing to Disclose
Katherine A. Zukotynski, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Apply basic anatomic, pathologic, and physiologic principles to the interpretation of PET/CT with emphasis on cancers of the thorax. 2) Identify artifacts that can influence interpretation of PET/CT studies and analyze factors that can improve image quality while minimizing patient risk. 3) Demonstrate understanding of issues on current and future practice patterns.

ABSTRACT

MSES32

Essentials of GI Imaging

Tuesday, Dec. 1 10:30AM - 12:00PM Location: S100AB

GI OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

MSES32A Imaging Esophageal Cancer

Participants
Peter L. Davis, MD, Pittsburgh, PA, (davispl@upmc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss how esophageal cancer treatment and prognosis is initially determined by stage of the cancer. 2) Understand the present TMN staging system for esophageal cancer. 3) Know how imaging techniques such as endoscopic ultrasound, computed tomography and PET/CT are used to determine the stage and, therefore, the treatment of esophageal cancer.

ABSTRACT

The treatment of esophageal cancer is initially determined by its pretreatment stage. The American Joint Committee on Cancer and the Union for International Cancer Control have recently revised the TNM (primary Tumor, lymph Node involvement, distant Metastasis) staging of esophageal cancer to reflect evidence-based findings supporting different treatments at different stages. The primary tumor stage is dependent on the depth of invasion of the esophageal wall. The T stage will determine if the tumor is resectable. The depth of tumor invasion is best determined by endoscopic ultrasound. CT may help tumor staging by identifying invasion of adjacent structures. Since there is an extensive submucosal lymphatic network that enables early lymph node spread, local-regional lymph node involvement is an important prognostic factor. Although esophageal cancers with lymph node involvement may be treated with just surgical resection, clinical trials have shown increased survival with the addition of neoadjuvant chemoradiotherapy or chemotherapy. Lymph node involvement is also best detected by endoscopic ultrasound, but may be supplemented by PET/CT and CT. Metastatic esophageal cancer has a very poor survival rate that is not significantly improved with surgical resections. Therefore, only chemotherapy is commonly used to treat patients with metastatic disease. PET/CT appears to be best for detecting and precisely locating metastatic disease, but may be supplemented by high quality CT.This lecture will review the recent staging changes. The appropriate use and imaging findings of endoscopic ultrasound, computed tomography, and PET/CT to determine the proper stage will be shown.

MSES32B Imaging of Colorectal Cancer

Participants
Seong Ho Park, MD, Seoul, Korea, Republic Of, (parksh.radiology@gmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define the role of radiological imaging in the management of colorectal cancer patients. 2) Apply state-of-the-art imaging techniques to evaluate colorectal cancer patients. 3) Explain the typical and atypical imaging findings of colorectal cancer lesions and differentiate them from treatment-related findings.

ABSTRACT

Not applicable

Handout:Seong Ho Park

http://abstract.rsna.org/uploads/2015/15001853/RSNA2015-MSES32B-Imaging of CRC-Park.pdf

MSES32C Liver Lesions in Cancer Patients

Participants
Jeong Min Lee, MD, Seoul, Korea, Republic Of (*Presenter*) Grant, Guerbet SA; Support, Siemens AG; Support, Koninklijke Philips NV ; Grant, Bayer AG; Consultant, Bayer AG; Grant, General Electric Company; Support General Electric Company; Grant, STARmed Co, Ltd; Grant, RF Medical Co, Ltd; Grant, Toshiba Corporation; Grant, Dong-Seo Medical Industrial Col, Ltd

LEARNING OBJECTIVES

1) Describe common incidental lesions in the liver at various stages of a cancer patient's journey. 2) To recognize the role of MRI in comparison with CT in characterization of incidental liver lesion in cancer patients, and explain how technical advances in MR can help address challenges in characterization of those incidental lesions. 3) To illustrate the diagnostic assessment of morphologic features of incidental liver lesions in cancer patients and review

MSQI32

Quality Improvement Symposium: Designing and Running a Successful Practice Quality Improvement Effort

Tuesday, Dec. 1 10:30AM - 12:00PM Location: S406B

SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Olga R. Brook, MD, Boston, MA, (obrook@bidmc.harvard.edu) (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

Attendees scoring 80% or higher on the SAM test may earn a Quality Essentials Certificate in the "Quality Improvement in Your Practice" domain.

Sub-Events

MSQI32A Project Design: Choosing the Topic and Team

Participants
James R. Duncan, MD, PhD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List improvement topics that will resonate with their teams and hospital leadership. 2) Develop operational measures that align with the intent of their improvement projects. 3) Identify the key attributes that lead to high performing teams. Attendees scoring 80% or higher on the SAM test may earn a Quality Essentials Certificate in the "Quality Improvement in Your Practice" domain.

ABSTRACT

Quality improvement begins when we acknowledge that our current products or services are less than ideal. In 2001, the Institute of Medicine found that our "health care delivery system does not provide consistent, high-quality medical call to all people …. Indeed, between the health care that we now have and the health care that we could have lies not just a gap, but a chasm." While progress has been made since 2001, numerous opportunities for improvement remain. This session will include strategies for choosing improvement topics in radiology. It will also walk participants through the process of forming an improvement team, creating a project charter and developing quality/safety metrics.

MSQI32B Using Data to Drive Improvement

Participants
Olga R. Brook, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Participants will be taught the critical difference between data used for research and data used for improvement. 2) Introduce participants to The Model for Improvement, an applied sciences methodology that is both easy to apply and shown to have manifest utility at solving wicked problems. Attendees scoring 80% or higher on the SAM test may earn a Quality Essentials Certificate in the "Quality Improvement in Your Practice" domain.

ABSTRACT

The applied sciences have flurished in every industry in the United States with the key exceptions of both heatlhcare and education. The pressing demands of the future 'value based economy' will require the American healthcare industry to adopt mordern improvement sciencs methdology. A great first step for leaders is to understand the key difference between research methodology and improvement methdology. Participants will be introduced to the popular improvement methdology 'The Model for Improvement'. The 'MFI' is a very pragmatic and effective way at testing change that results in real sustainable quality, financial, service or operational improvement.

MSQI32C QI in Radiology, the Joint Commission Perspective

Participants
David W. Baker, MD, MPH, Oakbrook Terrace, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To gain knowledge about Joint Commission standards for radiation safety. 2) To become familiar with the principles of The Joint Commission's Robust Process Improvement® model for improving quality of care. 3) To understand the Targeted Solutions Tool® approach for identifying key drivers of quality and safety at an institution to target for quality improvement. Attendees scoring 80% or higher on the SAM test may earn a Quality Essentials Certificate in the "Quality Improvement in Your Practice" domain.

ABSTRACT

Advances in diagnostic imaging have greatly improved the quality of medical care. However, imaging has substantial risks and is therefore an important target for projects to improve quality and safety. This talk will review diagnostic radiation-related Sentinel Events reported to The Joint Commission, Joint Commission Standards to prevent patient safety events, and ongoing and planned initiatives to improve imaging safety. It will also discuss The Joint Commission's Robust Process Improvement® model for quality improvement projects and The Joint Commission's Center for Healthcare Transformation's step-by-step process to accurately measure an organization's actual performance, identify their barriers to excellent performance, and direct them to proven solutions

that are customized to address their particular barriers.

Active Handout:David William Baker

http://abstract.rsna.org/uploads/2015/15003472/Active MSQI32C.pdf

MSRP31

RSNA Resident and Fellow Symposium: Career 101: Essentials for Every New Attending Radiologist (An Interactive Session)

Tuesday, Dec. 1 10:30AM - 12:00PM Location: E451B

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants

LEARNING OBJECTIVES

Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

MSRP31A 8 Reasons to Be Optimistic about the Future of Radiology

Participants
Amelia Wnorowski, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Jonathan W. Berlin, MD, Evanston, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Articulate some of the key reasons radiologists will be essential in new payment systems. 2) Understand the importance of radiology data in tracking disease management with regards to population health. 3) Consider ways radiologists can increase their outreach.

ABSTRACT

With the changing healthcare economic environment it is tempting for radiologists to feel pessimistic about their uncertain future role in healthcare systems. However, there is significant cause for optimism. Radiology utilization management, data mining, and screening in selected high risk populations will likely be important for new payment systems including accountable care organizations and bundled payments. Putting the job of the radiologist in perspective with other occupations is also helpful when considering a radiology career. This lecture will assess the opportunities for radiologists in new payment systems and also provide some comparative analysis of radiology and other occupations.

MSRP31B Medical Malpractice: Common Pitfalls New Attending Radiologists Should Avoid

Participants
Gelareh Sadigh, MD, Atlanta, GA, (gsadigh@emory.edu) (*Presenter*) Nothing to Disclose
Leonard Berlin, MD, Skokie, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify situations that can contribute to professional liability losses for radiologists. 2) Apply risk management strategies to enhance patient care and reduce potential professional liability exposures created by missed diagnoses, failure to adequaately communicate significant and unexpected radiologic findings to referring physicians and in certain situations to the patient, improperly performed interventional radiologic procedures, and improperly administering radiation oncology treatment. 3) Implement processes that will mazimize the chances of successfully defending a medical malpractice lawsuit if it is incurred.

ABSTRACT

This Course will explore and focus on the subject of medical malpractice litigation: what constitutes a violation of the standard of care, what are the common and uncommon events that lead to, and what is the role of expert witnesses in, a malpractice lawsuit, and how can the likelihood of being accused of malpractice be minimized.

RCA32

Productive Tools and Technology for the Academic Radiologist (Hands-on)

Tuesday, Dec. 1 10:30AM - 12:00PM Location: S401AB

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Mahesh M. Thapa, MD, Seattle, WA (*Moderator*) Nothing to Disclose
Mahesh M. Thapa, MD, Seattle, WA (*Presenter*) Nothing to Disclose
Jonelle M. Petscavage-Thomas, MD, MPH, Hummelstown, PA (*Presenter*) Consultant, Medical Metrics, Inc
Michael L. Richardson, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Know some of the latest technology for text processing. 2) Learn some of the latest technology for health in the workplace. 3) Be aware of technology that can make the RSNA meeting more pleasant and productive.

ABSTRACT

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Michael L. Richardson, MD - 2013 Honored Educator
Michael L. Richardson, MD - 2015 Honored Educator

RCB32

Making the Most of Google Docs: Docs, Slides, Forms, and Sheets (Hands-on)

Tuesday, Dec. 1 10:30AM - 12:00PM Location: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Marc D. Kohli, MD, San Francisco, CA (*Moderator*) Research Grant, Siemens AG
Marc D. Kohli, MD, San Francisco, CA (*Presenter*) Research Grant, Siemens AG
Ross W. Filice, MD, Washington, DC, (ross.w.filice@gunet.georgetown.edu) (*Presenter*) Nothing to Disclose
Aaron P. Kamer, MD, Indianapolis, IN, (apkamer@iupui.edu) (*Presenter*) Nothing to Disclose
Andrew B. Lemmon, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Thomas W. Loehfelm, MD, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the benefits and drawbacks of using Google tools for collaborative editing. 2) Explain issues related to storing protected health information in Google Drive. 3) Demonstrate the ability to use the Google productivity applications for collaboration on document, spreadsheet, online form and presentation creation.

ABSTRACT

Note: Attendees should have or create a Google account prior to coming to the session.In today's busy environment, we need tools to work smarter, not harder. Google's suite of productivity applications provides a platform for collaboration that can be used across and within institutions to produce documents and presentations and to obtain and work-up data with ease. However, with increased sharing, security concerns need to be addressed. At the end of the session, learners should be able to demonstrate creating, sharing, and editing a document as a group.

RCC32

Clinical Applications of 3D Printing

Tuesday, Dec. 1 10:30AM - 12:00PM Location: S501ABC

CA NR ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Shi-Joon Yoo, MD, Toronto, ON (*Moderator*) Owner, 3D HOPE Medical; CEO, IMIB-CHD;
Vincent B. Ho, MD, MBA, Bethesda, MD (*Moderator*) In-kind support, General Electric Company

Sub-Events

RCC32A Role of 3D Printing in Congenital Heart Disease

Participants
Shi-Joon Yoo, MD, Toronto, ON (*Presenter*) Owner, 3D HOPE Medical; CEO, IMIB-CHD;

LEARNING OBJECTIVES

1) Understand 3D printing process for heart models. 2) Know how 3D printing helps pediatric cardiac surgery, with case examples. 3) Know the future directions of 3D printing for cardiac surgery.

ABSTRACT

Using rapid prototyping or 3D printing, physical replicas of the hearts can be provided to surgeons before their surgical decision and procedure. The replicas fill the gap between the imagination from the medical images and the reality. By having the replicas in hands, the surgeons can make optimum surgical decision and simulate the intended procedures on the replica prior to the procedure. This allows precise surgical procedures with reduced procedure and anasthesia time. In canses in the grey zone for biventricular versus univentricular repair, the replicas are of tremendous help in a binary decision. The presentation will include a few clincal cases where 3D printing played a crucial role in surgical decision making.

RCC32B 3D Surgical Planning Using Printed Models: The Surgeon's Perspective

Participants
Edward J. Caterson, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

RCC32C 3D Surgical and Treatment Planning Using Printed Models

Participants
Frederik L. Giesel, MD, MBA, Heidelberg, Germany (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) History of 3D-Printing. 2) Imaging modalities and post-processing procedures to provide data surrogates for 3D-printing. 3) Concept of 3D-printing for improved clinical services. 4) Limitations and challanges of 3D-printing in surgical planning.

ABSTRACT

This presentation outlines the impact of 3D-printing in the imaging environment. Applications in the medical field are reviewed and growing clinical applications are discussed. Starting with an overview of current 3D-printing technologies including fused deposition modelling (FDM), selective laser sintering (SLS), and stereolithography (SLA) common techniques for generating 3D object models based on medical imaging are illustrated. Typically, imaging source data from different modalities are post-processed using dedicated algorithms and software in order to generate triangle mesh surface data. These surface data are usually exported to STL-files that are commonly understood by current 3D printing machines. 3D-printed objects are most often made from plastic, such as ABS, PA, or PLA, but metal or other material is even possible. Finally the presentation will demonstrate how 3D-printed objects are valuable for treatment planning, treatment procedures in several clinical subspecialties, intra-operative surgical navigation, or for prosthesis production. However, medical applications of 3D-printing are still in a very early phase but the growing awareness in the medical and non-medical field nowadays support the promising utilization and development in the very near future.

RCC32D Validation of Coronary Contrast Gradients Using 3D Coronary Phantoms

Participants
Dimitris Mitsouras, PhD, Boston, MA (*Presenter*) Research Grant, Toshiba Corporation; Speakers Bureau, Toshiba Corporation

LEARNING OBJECTIVES

1) Learn about which 3D printing technologies can produce physiological compliant vascular phantoms. 2) Recognize those in vivo imaging techniques that can be translated into vascular models that can be 3D printed. 3) Be able to describe the steps required in developing an in silico plus in vitro experiment to explain an imaging finding. 4) Be able to explain the reason for the coronary contrast enhancement gradient seen in standard coronary CT angiography.

ABSTRACT

3D-printed cardiovascular models are poised to become a disruptive force in the development of novel functional CT and MR imaging techniques. With 3D printing, patient-specific models can be produced for physiologically accurate - with respect to both pathophysiology and underlying physics - validation studies that are not otherwise feasible due to e.g., radiation burden, scan time,

and cost. Multiple 3D printing technologies are key for such applications, particularly regarding vascular compliance and incorporation of hard materials for e.g., calcifications. Similarly, multiple imaging techniques such as rotational DSA, CT and MRI can be used to produce such models. A particularly important application is validation of in silico computational fluid dynamics (CFD) simulations that have been used to advance our understanding of cardiovascular disease and imaging methods developed to diagnose it in the last two decades. A given patient-specific model simulated with CFD can now concurrently be realized for identical in vitro flow experiments to validate conclusions drawn from the numerical model. Two examples are the coronary Transluminal Attenuation Gradient (TAG) and simulated fractional flow reserve (FFR) being developed for the non-invasive detection of significant coronary artery disease from standard CT angiography. We will showcase in vitro CTA experiments to elucidate the intra-luminal kinetics of iodinated contrast that give rise to TAG as an example of the steps from in vivo image acquisition, to lumen segmentation and preparation for 3D printing, and in vitro experimentation. Just as numerical 3D modeling has been a disruptive application of computational fluid dynamics methods with the potential to bridge the gap between understanding anatomy and function, 3D printing is poised to be a disruptive application of in vivo imaging and additive manufacturing to advance our understanding of pathophysiology, and new imaging techniques and devices.

RCC32E Blood Flow in the Thoracic Aorta Elucidated with 3D Models

Participants
Michael Markl, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the use of 3D models of the aorta for the in-vitro simulation of aortic hemodynamics. 2) Explain the potential of in-vitro 4D flow MRI for the modeling and systematic analysis of the influence of common aortic pathologies on local and global 3D flow patterns in the aorta.

ABSTRACT

Flow sensitive MRI offers the ability to assess anatomy as well as flow characteristics in healthy and pathological blood vessels and is therefore an attractive tool for the diagnosis of vascular diseases. However, in-vivo studies do not allow the prediction of hemodynamic changes due to vascular modifications. Realistic vascular in-vitro 3D phantoms in combination with MRI flow measurements allow to model different vascular deformations and evaluate their effect on blood flow dynamics. This presentation will provide a review of the methods for the in-vitro simulation of aortic 3D blood flow with realistic boundary conditions and review previously reported application for the simulation of common aortic pathologies and their impact on aortic hemodynamics.

SPCP31

Mexico Presents: The Challenges of Radiology Education in Mexico and Some Proposals for Mexico and Latin American Countries

Tuesday, Dec. 1 10:30AM - 12:00PM Location: E353C

ED OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

FDA Discussions may include off-label uses.

Participants
Jose Rene Manuel Anguiano-Martinez, MD, Aguascalientes, Mexico (*Presenter*) Nothing to Disclose
Armando Lopez SR, MD, Mexico, Mexico (*Presenter*) Nothing to Disclose
Guillermo Elizondo-Riojas, MD, PhD, Monterrey, Mexico, (elizondoguillermo@hotmail.com) (*Presenter*) Research Consultant, Caymus Medical, Inc
Luis Felipe Alva Lopez, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose
Jose L. Ramirez-Arias SR, MD, PhD, Mexico, Mexico, (jlramirez.arias@saludangeles.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Explain some of the problems of the 52 university postgraduate programs in radiology ,and also the need of more academic radiologists. 2) To describe the different needs of radiology education through the nation as well as the need of more academic radiologist to teach the present and future generations in the upcoming radiological knowledge. 3)To recognize for this purpose the support of international societies , RSNA, ARRS, ACER, CIR ,ESR ,SERAM.

ABSTRACT

Mexico has 52 university radiology programs. For a country of one hundred million inhabitants there are no more than six thousand radiologists .More radiologists are needed and for that purpose more academic radologists areneeded .We also consider that there must be a standarization of radiology programs and our radiology institutions ,Federation ,Societies, Board and College of Radiology are working together for this unification .We have had for many years the academic support of many International Radiology Institutions ,specially by RSNA ,we will mention in the presentation what results have been obtainedThere will be also information of Mexico and the health system.

URL

Handout:Jose Rene Manuel Anguiano-Martinez

http://abstract.rsna.org/uploads/2015/15000046/Presentacion Dr. Anguiano RSNA 2015.pptx

Sub-Events

SPCP31A Opening Remarks

Participants
Ronald L. Arenson, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPCP31B Closing Remarks

Participants
James P. Borgstede, MD, Colorado Springs, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RCA33

3D Printing (Hands-on)

Tuesday, Dec. 1 12:30PM - 2:00PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Moderator*) Research Grant, Toshiba Corporation;
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Research Grant, Toshiba Corporation;
Jane S. Matsumoto, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Dimitris Mitsouras, PhD, Boston, MA (*Presenter*) Research Grant, Toshiba Corporation; Speakers Bureau, Toshiba Corporation
Andreas Giannopoulos, MD, Boston, MA (*Presenter*) Nothing to Disclose
Nicole Wake, MS, New York, NY (*Presenter*) Nothing to Disclose
Peter C. Liacouras, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose
Thomas A. Foley, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Kiaran P. McGee, PhD, Rochester, MN (*Presenter*) Nothing to Disclose
Michael W. Itagaki, MD, MBA, Seattle, WA (*Presenter*) Owner, Embodi3D, LLC
Shannon N. Zingula, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Leonid Chepelev, MD,PhD, Ottawa, ON (*Presenter*) Nothing to Disclose
Adnan M. Sheikh, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
AiLi Wang, Ottawa, ON (*Presenter*) Nothing to Disclose
Wilfred Dang, BS, Ottawa, ON (*Presenter*) Nothing to Disclose
Ekin P. Akyuz, BSc, Ottawa, ON (*Presenter*) Nothing to Disclose
Taryn Hodgdon, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carlos H. Torres, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Anji Tang, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the Standard Tessellation Language (STL) file format that is used in 3D priting. 2) Be exposed to a software package to enable segmentation of DICOM images using semi-automated and manual segmentation algorithms, allowing the user to demarcate desired parts. The most commonly used tools are thresholding, region growing, and manual sculpting. 3) Learn refinement of an output STL output so that it can be optimized for accurate printing of the desired anatomy and pathology. This step uses Computer Aided Design (CAD) software is used to perform steps such as "wrapping" and "smoothing" to make the model more homogeneous.

ABSTRACT

"3D printing" refers to fabrication of a tangible object from a digital file by a 3D printer. Materials are deposited layer-by-layer and then fused to form the final object. There are several 3D printing technologies that share similarities but differ in speed, cost, and resolution of the product. Digital Imaging and Communications in Medicine (DICOM) image files cannot be used directly for 3D printing; further steps are necessary to make them readable by 3D printers. The purpose of this hands-on course is to convert a set of DICOM files into a 3D printed model through a series of simple steps. Some of the initial post-processing steps may be familiar to the radiologist, as they share common features with 3D visualization tools that are used for image post-processing tasks such as 3D volume rendering. However, some are relatively or completely new to radiologists, including the manipulation of files in Standard Tessellation Language (STL). It is the STL format that is read by the 3D printer and used to output the hand held part of the patient's anatomy. This 90 minute session will begin with a DICOM file and will proceed through the steps to create a printable STL file. An extensive training manual will be provided before the meeting. It is highly recommended that participants review the training manual to optimize the experience at the workstation.

URL

Active Handout:Frank John Rybicki

http://abstract.rsna.org/uploads/2015/14003457/Active RCA13.pdf

RCB33

Creating and Delivering Online and Mobile Education Content: From Online Courses to Interactive iBooks (Hands-on)

Tuesday, Dec. 1 12:30PM - 2:00PM Location: S401CD

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
George L. Shih, MD, MS, New York, NY, (george@cornellradiology.org) (*Moderator*) Consultant, Image Safely, Inc; Stockholder, Image Safely, Inc; Consultant, Angular Health, Inc; Stockholder, Angular Health, Inc;

LEARNING OBJECTIVES

1) Assess the potential of online and mobile e-learning innovations to augment your residents', medical students', and staff's educational curricula. 2) Acquire the domain knowledge to use already available content (eg, PowerPoint presentations) to both create video content and deploy e-learning courses on modern web-based and mobile platforms. 3) Acquire the domain knowledge to create an interactive Apple iBook (electronic books) with text, images, video, and interactive questions.

ABSTRACT

1. From OpenCourseWare to the Khan Academy, and now to Coursera and edX, e-learning has been dramatically improved over the last decade, changing education from the normal classroom into learning done at convenience, and also allows for more creative and engaging content during the typical lecture. Stanford Med published positive initial findings in utilizing video-based lectures in an interactive class setting. Leveraging this new way of learning, requires knowledge about the types of technology and platforms for these courses.2. The workflow required to host an e-learning course can be summarized in 3 steps: (a) creating the educational content, (b) hosting the materials, and (c) making the materials available to the intended audience. E-content today typically consists of lecture slides along with video recordings captured by technology like TechSmith Camtasia (non-free) and Apple Quicktime (free). Once the materials are created and edited, one must choose a suitable hosting platform realistic to the skills and goals of the instructor with options that include coursesites.com, iTunes U, and YouTube / Google Hangouts. Students can then be invited to view the material or the content can be made available to the public.3. Creating and publishing e-books is a great way to share your teaching material as an engaging interactive tool. Publishing in e-book format solves many logistical problems of conventional publishing and the e-book format has interactive features that paper books can't match. We will review the process of creating your own e-book from assembling material to layout design to submitting for e-publication. Specifically Apple iBooks Author software will be used to demonstrate converting an existing Powerpoint presentation or journal publication into an e-book. In addition, the course will go over how to publish with or without DRM (copy-protection) and ways to obtain an ISBN for publishing for sale. Online resources will also be reviewed.

Sub-Events

RCB33A Screencasting Basics on the Desktop and on the iPad

Participants
Ian R. Drexler, MD, MBA, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RCB33B Massive Open Online Course (MOOC) Creation and Hosting

Participants
Kurt T. Teichman, BSc, MEng, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RCB33C Interactive iBooks to Supplement your Online Course

Participants
Alan C. Legasto, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RCC33

Imaging 3.0: Informatics Tools to Improve Radiologists' Productivity, Quality and Value

Tuesday, Dec. 1 12:30PM - 2:00PM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
J. R. Geis, MD, Fort Collins, CO (*Moderator*) Advisor, Nuance Communications, Inc; Investor, Montage Healthcare Solutions; Vice Chair, ACR IT Informatics Commission

Sub-Events

RCC33A ACRSelect - Using Informatics to Complying with PAMA: CDS Image Ordering Legislation

Participants
Keith J. Dreyer, MD,PhD, Boston, MA (*Presenter*) Co-Chairman, Medical Advisory Board, Merge/IBM

LEARNING OBJECTIVES

1) Be informed of the new federal legislation requiring the use of Clinical Decision Support (CDS) for the ordering of medical imaging required by CMS in 2017. 2) Understand the challenges of implementing CDS in the hospital and imaging center environments. 3) Learn the value of embedding CDS into the EHR and CPOE ordering process. 4) Learn methods to use CDS to manage the utilization of medical image appropriateness. 5) Become familiar with methods to implement CDS in an ACO environment.

RCC33B Radiology Assist: Informatics Tools to Produce a More Valuable Report and Still Report Fast

Participants
Tarik K. Alkasab, MD, PhD, Boston, MA, (talkasab@mgh.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the motivations for integrating clinical decision support (CDS) into the clinical practice of radiologists. 2) Understand how CDS modules can be defined for use in radiologist reporting. 3) Understand what it looks like for a CDS system to be integrated with radiologist reporting. 4) Understand the challenges associated with deploying CDS for radiologists.

ABSTRACT

URL

RCC33C Use Your Data to Reduce Costs and Demonstrate Your Value to the Hospital

Participants
Woojin Kim, MD, Philadelphia, PA, (woojinrad@gmail.com) (*Presenter*) Co-founder, Montage Healthcare Solutions, Inc; Shareholder, Montage Healthcare Solutions, Inc; Board of Directors, Montage Healthcare Solutions, Inc; Advisory Board, Zebra Medical Vision Ltd

LEARNING OBJECTIVES

1) Understand the role of business intelligence (BI) tools in providing value-based care. 2) Understand how BI can provide effective monitoring of various components of the imaging value chain, including imaging appropriateness, modality operations, image interpretation and reporting, and report communication. 3) Learn how data mining can improve report quality by ensuring proper documentation and reducing errors. 4) Learn how one should implement a BI system and learn about potential problems to consider.

ABSTRACT

The goals of improving population health at a lower cost and higher quality are placing increased emphasis on value-based care over volume-based approach. Imaging 3.0™ is ACR's call to action for radiologists to take a leadership role in shaping America's future healthcare system through 5 key pillars, which are imaging appropriateness, quality, safety, efficiency and satisfaction. With the aims of delivering better value to patients, Imaging 3.0 has outlined what it calls "imaging value chain" where each link of this chain represents a discrete number of unique value opportunity activities. The imaging value chain includes following components: imaging appropriateness and patient scheduling, imaging protocols, modality operations, image interpretation and reporting, and report communication and referring physician interaction. In the center of the imaging value chain, inter-connected with every link, lie data mining and business intelligence (BI). Timely analysis and appropriate modification using data mining and BI tools are critical to the effective monitoring of all components of the imaging value chain. As a result, it is a critical component of your Imaging 3.0 informatics toolkit. Effective use of BI will allow access to right information at the right time for right decision. This presentation will discuss the basics of BI and its benefits. Specifically, attendees will learn how data mining and BI can monitor adherence to imaging appropriateness guidelines, modality capacity, patient throughput, radiation dose exposure, report standardization and quality including detection of errors and compliance with various reporting requirements including documentation of proper report communication. In addition, attendees will learn how one should implement a BI system, what are some potential problems to consider, and various tips for getting BI right.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at:

https://www.rsna.org/Honored-Educator-Award/

Woojin Kim, MD - 2012 Honored Educator

RCC33D Using Workflow Software to Improve Efficiency and Profitability

Participants
Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Stockholder, Evidentia Health, Inc; Stockholder, OneMedNet Corporation; Stockholder, VoiceIt Technologies, LLC

LEARNING OBJECTIVES

1) Become familiar with workflow technologies that are available and being used in other industries. 2) See how workflow terminologies can be applied in practice. 3) See how workflow engines have been applied in radiology.

ABSTRACT

Workflow is a critical element of safe and efficient practices. Workflow is usually supported by using relational databases, which tends to force a linear workflow into practice. SQL queries are also not optimal for detecting and handling error conditions.Workflow engines are used in other industries for exactly those reasons--they help enforce an agreed upon optimal pathway of events, and make it easy and clear how to deal with error and exception conditions. While they have been applied in healthcare, those experiments have usually failed because the implementation did not handle error conditions well, and did not completely model the richness and complexity of healthcare. Radiology tends to be more straightforward, and may be a good area to use workflow engines. In this session, we will describe one implementation in a clinical practice, as well as use in research and clinical trials.As we have begun to use workflow engines, it became apparent that agreeing on the names for key steps in the workflow would be helpful. Such a common lexicon would help us to assure that workflow was done in the same way in different locations. It could also allow us to measure the efficiency of workflows. This latter aspect was perceived to be of great value to practices accross the world, and led to the creation of the SIIM Workflow Initiative in Medicine (SWIM) lexicon, which is now a part of RadLEX. The basic concepts of SWIM and its connection toe IHE and the practice will be described.

MSAS33

Radiation Safety and Dose Optimization (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Tuesday, Dec. 1 1:30PM - 3:00PM Location: S105AB

CA PD SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Richard Evans, London, United Kingdom (*Moderator*) Nothing to Disclose
Louise Coleman, London, United Kingdom (*Moderator*) Nothing to Disclose

Sub-Events

MSAS33A Dose Optimization in Pediatric Cardiology

Participants
Sonyia L. McFadden, MD, Antrim, United Kingdom, (s.mcfadden@ulster.ac.uk) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Comprehend current levels and risks of radiation exposure in Paediatric Interventional Cardiology (PIC). 2) Be able to calculate Local Diagnostic Reference Levels (LDRL). 3) Identify the different Interventional cardiology (IC) protocols currently used across the UK/Ireland and their impact on radiation dose/image quality. 4) Apply best practice in PIC.

ABSTRACT

PURPOSEThe number of pediatric interventional cardiology (PIC) procedures being performed has increased rapidly in recent years due to their reliability and cost effectiveness. However, interventional cardiology procedures have been reported to contribute to the highest doses of radiation to patients from medical examinations. Previous authors have estimated DRL for PIC and identified a wide variation of radiation exposure to the patient.METHOD AND MATERIALSA questionnaire study was used to investigate the PIC protocols currently used in clinical departments. Experimental studies were performed on anthropomorphic phantoms investigating these different variations in practice and the subsequent effect on image quality and radiation dose. A subsequent randomised controlled trial investigating these different protocols and their effect on image quality and dose is currently ongoing in the clinical environment. The effect of different scatter removal techniques on radiation dose and associated DNA damage was also investigated by quantifying γH2AX-foci as a biomarker of radiation-induced effect.RESULTSWide variations in imaging protocols are currently being used across different hospitals. These variations in practice are having a significant impact on the resultant radiation dose to the patient. Results of experimental studies on anthropomorphic phantoms showed that radiation dose reductions of 30% to 50% could be achieved by removing the anti-scatter grid, introducing an air gap and decreasing the frame rate with minimal impact on image quality. Radiation induced DNA damage is evident in patients undergoing PIC procedures and mean γH2AX-foci can be significantly greater in different hospitals depending on the protocol used.CONCLUSIONGreat variation in radiation exposure exists across hospitals performing similar examinations on similar sized patients. There is a clear need for standardised protocols and guidelines.The anti-scatter grid should be removed routinely for newborn and infant patients undergoing PIC. The air gap should be introduced when possible.CLINICAL RELEVANCE/APPLICATIONSimple modifications to clinical protocols will ensure the radiation dose to pediatric patients is kept ALARA without affecting image quality or diagnostic efficacy.

MSAS33B Learning from Errors and Near-Misses

Participants
Sarah Peters, Didcot, United Kingdom, (sarah.peters@phe.gov.uk) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify common causes of errors and near-misses in the UK. 2) Describe the way errors and near-misses are investigated and reported in the UK. 3) Compare several approaches to disseminating learning from errors and near-misses.

ABSTRACT

Healthcare professionals have a duty to inform their employer when things go wrong, regardless of whether it leads to actual harm. In turn employers should create an environment where staff members are supported and encouraged to report errors and near-misses.The World Health Organization (WHO) defines an error as "the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim. Errors may be errors of commission or omission, and usually reflect deficiencies in the systems of care".The first stage in learning from an error is to investigate not just the 'who was involved, what happened and when?' but more importantly the 'why did it happen?' These investigations should seek to establish the facts surrounding the error rather than apportion blame, unless there was obvious malicious intent. Error investigations should also include recommendations and changes to systems of work and procedures that will lead to improvements in patient safety and prevent recurrence.For every error or incident, many more near misses will occur. The reporting and subsequent investigation of near misses can reduce the chances of an actual error occurring.No system is perfect, especially when human beings play an integral part in the process. The key point is that when errors and near-misses occur, organisations and individuals must learn from them and also ensure that this learning is shared. This could be on a local, regional or even national level to avoid the same mistake happening over and over again, at multiple locations and impacting the lives of numerous patients.This presentation will look at common errors and near-misses from a UK perspective as well as a number of approaches that are used both locally and nationally to ensure that learning is shared amongst the Radiology community.

MSCC33

Case-based Review of Nuclear Medicine: PET/CT Workshop-Cancers of the Abdomen and Pelvis (In Conjunction with SNMMI) (An Interactive Session)

Tuesday, Dec. 1 1:30PM - 3:00PM Location: S406A

GI GU CT NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Janis P. O'Malley, MD, Birmingham, AL (*Director*) Nothing to Disclose
Ciaran J. Johnston, MD, Dublin, Ireland (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the utility of PET CT in staging a wide variety of primary and recurrent GI, GU and gynecological cancers. 2) Differentiate patterns of physiological FDG uptake from pathologic processes. 3) Expalin the importance of CT correlation for selected cancer subgroups. 4) Describe the role of PET CT in assessing patient response to radiation therapy and chemotherapy, including early assessment and PET influenced treatment strategies.

MSES33

Essentials of Musculoskeletal Imaging

Tuesday, Dec. 1 1:30PM - 3:00PM Location: S100AB

MK MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

MSES33A Introduction to Musculoskeletal Ultrasound

Participants
Maha Torabi, MD, Winston Salem, NC, (mtorabi@wakehealth.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List the indications, benefits, and limitations of musculoskeletal ultrasound. 2) Demonstrate proper transducer manipulation and system optimization to produce diagnostic images. 3) Recognize common pathology of the musculoskeletal system as seen at ultrasound.

ABSTRACT

Active Handout:Maha Torabi

http://abstract.rsna.org/uploads/2015/15001838/Active MSES33A.pdf

MSES33B MRI of Injuries in the High Performance Athlete

Participants
William B. Morrison, MD, Philadelphia, PA (*Presenter*) Consultant, General Electric Company Consultant, AprioMed AB Patent agreement, AprioMed AB Consultant, Zimmer Holdings, Inc

LEARNING OBJECTIVES

1) Recognize patterns of injury in high performance athletes using MRI. 2) Be able to relate pathology to common injuries in the general population. 3) Realize implications of injury in females and adolescent athletes.

MSES33C Return to Play: Imaging the Athlete

Participants
Bethany U. Casagranda, DO, Pittsburgh, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define Return to Play. 2) Discuss social pressures and controversial dogma surrounding Return to Play. 3) Recognize imaging findings of common sports related injuries. 4) Discuss the radiologist's role in diagnosis of pathology and communication with referring physicians.

ABSTRACT

Athletes of all levels are encumbered by injury and the social stresses of returning to play (RTP). RTP is a broad topic describing the time it takes an athlete to return to their sport after sustaining an injury. This discussion will encompass various levels of play, several sports and position-specific injuries. The focus will be on common injuries as well as controversial topics. Overall, emphasis is on imaging and the role of the radiologist caring for athletes.

MSQI33

Quality Improvement Symposium: Common Mistakes in Practice Quality Improvement

Tuesday, Dec. 1 1:30PM - 3:00PM Location: S406B

SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
David B. Larson, MD, MBA, Los Altos, CA, (david.larson@stanford.edu) (*Moderator*) Intellectual property license agreement, Bayer AG; Potential royalties, Bayer AG

LEARNING OBJECTIVES

1) Understand common reasons why practice quality improvement projects tend to fail. 2) Understand strategies to anticipate and overcome pitfalls to successfully complete practice quality improvement projects. Attendees scoring 80% or higher on the SAM test may earn a Quality Essentials Certificate in the "Quality Improvement in Your Practice" domain.

ABSTRACT

Meaningful quality improvement requires meaningful organizational change. Change efforts can fail for a variety of reasons. In this session, authors will discuss common reasons why improvement efforts tend to be unsuccessful, and provide strategies for increasing the likelihood of success.

Sub-Events

MSQI33A Pitfalls to Avoid with Project Design

Participants
David B. Larson, MD, MBA, Los Altos, CA (*Presenter*) Intellectual property license agreement, Bayer AG; Potential royalties, Bayer AG

LEARNING OBJECTIVES

1) Understand common pitfalls associated with Practice Quality Improvement design and how they can derail a project. 2) Understand strategies to anticipate and successfully overcome these pitfalls. Attendees scoring 80% or higher on the SAM test may earn a Quality Essentials Certificate in the "Quality Improvement in Your Practice" domain.

ABSTRACT

Like with any meaningful project, the success of a PQI project depends to a large extent on project preparation and design. The author will discuss common pitfalls associated with PQI project design and strategies for anticipating and overcoming them to increase the likelihood of project success.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

David B. Larson, MD, MBA - 2014 Honored Educator

MSQI33B Pitfalls to Avoid with Project Execution

Participants
James V. Rawson, MD, Augusta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review reasons projects fail. 2) Review tools to avoid projects not meeting goals. Attendees scoring 80% or higher on the SAM test may earn a Quality Essentials Certificate in the "Quality Improvement in Your Practice" domain.

ABSTRACT

Performance improvement projects can be well conceived but fail at the implementation or execution stage. Such failures often occur for predictable and hence avoidable reasons. The author will discuss reasons for failed executions and potential tools to help projects meet goals.

MSQI33C How to Meet and Pass the American Board of Radiology Practice Quality Improvement (PQI) Requirements and Audit

Participants
David Laszakovits, MBA, Tucson, AZ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the Essential Elements of a PQI project. 2) Understand the participation options for fulfilling the PQI requirements. 3) Understand what documentation needs to be provided to the ABR in the event of an audit. Attendees scoring 80% or higher on the SAM test may earn a Quality Essentials Certificate in the "Quality Improvement in Your Practice" domain.

ABSTRACT

The ABR requirements specify that each diplomate complete at least one PQI project every three years. The author will discuss the essential elements of a PQI project, the various options for participation and what documentation should be retained for audit purposes.

MSRP32

RSNA Resident and Fellow Symposium: Career 102: Essentials for Residency and Job Success (An Interactive Session)

Tuesday, Dec. 1 1:30PM - 3:00PM Location: E451B

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants

LEARNING OBJECTIVES

Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

MSRP32A How to Convert an Interview into a Job Offer

Participants
Candice Bookwalter, MD, PhD, Rochester, MN (*Presenter*) Nothing to Disclose
Fred T. Lee JR, MD, Madison, WI (*Presenter*) Stockholder, NeuWave Medical, Inc; Patent holder, NeuWave Medical, Inc; Board of Directors, NeuWave Medical, Inc ; Patent holder, Medtronic, Inc; Inventor, Medtronic, Inc; Royalties, Medtronic, Inc

LEARNING OBJECTIVES

1) At the conclusion of this lecture, attendees should understand the different parts of the interview process, how to prepare for an interview, and strategies to maximize success during the interview day.

MSRP32B Six Must Know Strategies for Success Every Radiology Trainee Should Master

Participants
Richard E. Sharpe JR, MD, MBA, Denver, CO, (RichSharpeJr@gmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) This presentation will allow participants at every stage of radiology training and practice to identify several key skills and strategies they can adopt to be more successful, and better accomplish their goals.

ABSTRACT

MSRP32C Candid, Frank and Personal Job Advice from Recent Grads

Participants
Nancy J. Benedetti, MD, Greenwood Village, CO (*Presenter*) Nothing to Disclose
Candice Bookwalter, MD, PhD, Rochester, MN (*Presenter*) Nothing to Disclose
Richard E. Sharpe JR, MD, MBA, Denver, CO, (RichSharpeJr@gmail.com) (*Presenter*) Nothing to Disclose
Andrew K. Moriarity, MD, Grand Rapids, MI (*Presenter*) Nothing to Disclose
Joseph H. Yacoub, MD, Maywood, IL (*Presenter*) Nothing to Disclose

VSIO31

Interventional Oncology Series: Lung and Musculoskeletal

Tuesday, Dec. 1 1:30PM - 6:00PM Location: S405AB

CH MK IR RO

AMA PRA Category 1 Credits ™: 4.25
ARRT Category A+ Credits: 5.00

FDA Discussions may include off-label uses.

Participants
Matthew R. Callstrom, MD, PhD, Rochester, MN (*Moderator*) Research Grant, Thermedical, Inc Research Grant, General Electric Company Research Grant, Siemens AG Research Grant, Galil Medical Ltd

Sub-Events

VSIO31-01 How to Approach Lung Ablation

Tuesday, Dec. 1 1:30PM - 1:50PM Location: S405AB

Participants
Constantinos T. Sofocleous, MD, PhD, New York, NY (*Presenter*) Consultant, Sirtex Medical Ltd

VSIO31-02 Role for SBRT in the Treatment of Primary Lung Tumors

Tuesday, Dec. 1 1:50PM - 2:10PM Location: S405AB

Participants
Kenneth R. Olivier, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review role of SBRT in the primary management of early stage NSCLC. 2) Review updates to the literature on SBRT including: a. Dose and schedule of SBRT. b. Comparison of SBRT to surgery.

ABSTRACT

Stereotactic Body Radiotherapy (SBRT) is an important treatment modality for patients with inoperable Non-Small Cell Lung Cancer. It provides effective local control of early stage Lung Cancers and is associated with minimal toxicity. In this presentation I will review this role and discuss the current literature comparing SBRT to observation and surgery.

VSIO31-03 Statistically Significant Higher Risk of Local Recurrence after Ablation in KRAS Mutant Lung Adenocarcinomas Compared with Wild Type

Tuesday, Dec. 1 2:10PM - 2:20PM Location: S405AB

Participants
Etay Ziv, MD,PhD, New York, NY (*Presenter*) Nothing to Disclose
Song Gao, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Joseph P. Erinjeri, MD, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Elena N. Petre, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Carole A. Ridge, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Jeremy C. Durack, MD, New York, NY (*Abstract Co-Author*) Scientific Advisory Board, Adient Medical Inc Investor, Adient Medical Inc
Constantinos T. Sofocleous, MD, PhD, New York, NY (*Abstract Co-Author*) Consultant, Sirtex Medical Ltd
Stephen B. Solomon, MD, New York, NY (*Abstract Co-Author*) Research Grant, General Electric Company

PURPOSE

To evaluate the association between mutation status of lung adenocarcinoma patients and local recurrence after ablation.

METHOD AND MATERIALS

We performed a retrospective review to identify patients treated with ablation for lung adenocarcinoma and that had available genetic testing for both EGFR and KRAS mutations. Surgical or biopsy specimens were considered only if they were from the same site as the ablation (either pre- or post-ablation). A subset of the EGFR mutants were also tested for T790M mutation. Local recurrence was either biopsy proven or based on a combination of clinical and imaging parameters. Chi-square test was used to identify statistically significant association with local recurrence.

RESULTS

We identified a total of 53 lung adenocarcinomas treated with lung ablation and which had genetic testing to identify both EGFR and KRAS mutations. Overall stage of tumor ranged from stage 1A to stage IV. Median tumor size was 1.6 cm (range: 0.8-3.3 cm). Of the 53 lung ablations, 53% (28) were on wild type (WT) lung adenocarcinomas, 34% (18) were on KRAS mutants and 13% (7) were on EGFR mutants. EGFR and KRAS mutants were mutually exclusive. Local recurrence rates were 29% (8/28) for WT, 67% (12/18) for KRAS, and 29% (2/7) for EGFR mutants. Local recurrence in the KRAS group was statistically significant (p=0.01) compared with WT. There was no difference in the local recurrence rate of EGFR mutants compared with WT. Of note, the two local recurrences identified in the EGFR group also harbored a T790M mutation, associated with acquired resistance to tyrosine kinase inhibitors.

CONCLUSION

KRAS mutations are associated with statistically significant increased risk of local recurrence compared to WT. The local recurrence

KRAS mutations are associated with statistically significant increased risk of local recurrence compared to WT. The local recurrence rate of EGFR mutations are equivalent to WT. In our study EGFR local recurrences only occurred in the setting of T790M acquired resistance.

CLINICAL RELEVANCE/APPLICATION

KRAS mutation status of lung adenocarcinoma patients may be used as a prognostic tool to better stratify patients prior to lung ablation.

VSIO31-04 Minimally Invasive Surgery for Limited Lung Metastases

Tuesday, Dec. 1 2:20PM - 2:40PM Location: S405AB

Participants
Shanda Blackmon, MD, MPH, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define the role of surgical pulmonary metastasectomy. 2) Review the literature regarding surgical pulmonary metastasectomy. 3) Review advantages to minimally invasive surgical pulmonary metastasectomy. 4) Define future goals of a novel approach to comined multi-specialty approach to lung metastasectomy.

ABSTRACT

Care of the patient with pulmonary metastases (PM) has evolved through the years to now include a larger group of patients who may benefit from metastasectomy. The two most consistent prognostic factors for overall survival remain disease free interval (DFI) and number of pulmonary nodules. The one consistent factor in all series is that only patients achieving a complete (R0) resection have a longer survival. Many series find the # of nodules is no longer a factor determining survival if R0 resection can be obtained, even repeated metastasectomy. We no longer view extra-PM as a disqualifier for resection, as long as the dz can be completely resected and controlled.Patients are typically referred for immediate surgery if they present with a single PM or have a limited # of mets and a long DFI. Those who develop metastatic dz early are treated initially with chemotherapy to determine the pace of dz progression, if any, on treatment. Patients responding to chemotherapy, those with stable dz, and those with slow progression are referred for resection while those with rapidly progressive metastatic dz receive alternative chemotherapy treatment. Adjuvant chemotherapy is continued only if there is evidence of clinical benefit from preoperative chemotherapy. CT scanning is routinely performed to monitor dz progression.The surgical approach should be individualized. As imaging improves our ability to localize smaller nodules, less invasive options become more appealing and may facilitate less difficult repeat metastasectomy. Ablation (SABR/SBRT or lung CT-guided ablation by cryoablation, radiofrequency ablation or microwave ablation) has been used to treat patients with PM, and our institution uses a lung ablation tumor board to review which lesions are best treated with each modality, focusing on R0 treatment, lung preservation, and location of the tumor. Lung preservation achieved by ablation is important in patients who have had previous resections or who have compromised pulmonary function or in whom a lobectomy would be required for nodule removal. More prospective studies are needed and are underway. Better understanding of the biology of the tumor and more developed histologic-specific nomograms may ultimately improve our ability to better select patients. As systemic therapy improves, treatment of local residual oligometastic dz will become an increasingly important consideration.

VSIO31-05 Percutaneous Ablation of Lung Metastases

Tuesday, Dec. 1 2:40PM - 3:00PM Location: S405AB

Participants
Alison R. Gillams, MBChB, London, United Kingdom, (alliesorting@gmail.com) (*Presenter*) Advisory Board, Covidien AG

LEARNING OBJECTIVES

1) To define the patients most suitable for percutaneous image guided ablation of their metastases. 2) To present clinical outcomes of percutaneous ablation in the common metastatic groups - colorectal, sarcoma, renal, head and neck etc. 3) To understand the role of ablation in conjunction with other therapeutic modalities - surgery, SBRT or chemotherapy.

ABSTRACT

Ablation is a very effective tool for the local control of small volume lung tumours. It is the optimal technique for bilateral or small volume but multifocal disease. Although any metastatic deposit can be treated, the most common tumour groups to be referred for ablation are colorectal, sarcoma, head and neck and renal tumours.Colorectal metastases form the largest single cohort of patients. Results from metastasectomy suggest a survival advantage. Number, distribution and speed of development i.e. disease free interval between primary resection and the development of lung metastases, are considered when deciding whether a patient is operable. Surgical preference is given to fit patients with fewer than 3 metachronous metastases, preferably unilateral, a longer disease free interval and no extra-pulmonic disease. Ablation is currently considered in inoperable patients. Our analysis of 122 patients who were not operable candidates but who had small volume colorectal lung metastases showed a median survival of 41 months and a 3 year survival of 57%. Survival was better in patients with smaller tumours; median 51 months, 3-year 64% for

VSIO31-06 Complications and Management after Lung Ablation

Tuesday, Dec. 1 3:00PM - 3:20PM Location: S405AB

Participants
Damian E. Dupuy, MD, Providence, RI, (ddupuy@lifespan.org) (*Presenter*) Research Grant, NeuWave Medical Inc Board of Directors, BSD Medical Corporation Stockholder, BSD Medical Corporation Speaker, Educational Symposia

LEARNING OBJECTIVES

1) Understand the most common adverse events related to lung ablation. 2) Learn how to prevent and treat some of these adverse events. 3) Illustrate some of the more severe adverse events (grade 3-5) with clinical examples.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying

educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Damian E. Dupuy, MD - 2012 Honored Educator

VSIO31-07 Morphological Appearance of Radiofrequency Ablated Stage I NSCLC in Medically Inoperable Patients as Related to Recurrence: Results from the ACOSOG Z4033 (Alliance Trial)

Tuesday, Dec. 1 3:20PM - 3:30PM Location: S405AB

Participants
Lillian Xiong, MD, Providence, RI (*Presenter*) Nothing to Disclose
Erica S. Alexander, BS, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Shauna Hillman, MS, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Angelina D. Tan, BS,BA, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Grayson L. Baird, MS, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Hiran Fernando, MD, Boston, MA (*Abstract Co-Author*) Consultant, CSA Medical, Inc Research Consultant, Galil Medical Ltd Research Grant, Deep Breeze Ltd
Damian E. Dupuy, MD, Providence, RI (*Abstract Co-Author*) Research Grant, NeuWave Medical Inc Board of Directors, BSD Medical Corporation Stockholder, BSD Medical Corporation Speaker, Educational Symposia

PURPOSE

This study evaluates tumor and ablation zone morphology as related to recurrence in medically inoperable patients with stage I NSCLC undergoing CT-guided RFA in a prospective multi-center trial.

METHOD AND MATERIALS

This prospective, multicenter group trial was approved by each institutional review board. 54 patients from 16 US sites were enrolled, of these, 50 patients (23 Men, 27 Women; mean age 75.3±7.5 years) met eligibility requirements. Patients were followed using CT; evidence of CT recurrence and pre- and post-ablation imaging characteristics were recorded. Characteristics evaluated included tumor/ablation zone shape (round, ovoid, bilobed, irregular), size, borders (smooth, speculated, lobulated), distance to large vessels/airway and distance to pleura.

RESULTS

A difference was observed for months to recurrence between those with ablation zones greater than 3cm and less than 3cm (p=.0023). The median time of recurrence for those with ablation zones less than 3cm was 8.16 months, while the median recurrence time for those with zones greater than 3cm could not be determined. Recurrence free probability was 30% for those with ablation zones less than 3cm and 75% for those with zones greater than 3cm.No significant differences were found between those with and without recurrence for age (p=.47), performance score (p=.43), histology (p=.34), baseline tumor SUV (p=.91), tumor size (p=.59), peak power (p=.92), peak current (p=.63), max temp (p=.65), total time (p=.28), shape (p=.30), cavitation (p=.29), sphericity (p=.45), distance from tumor edge to large vessel (p=.62), and distance to pleura (p=.25).

CONCLUSION

Of those morphological characteristics considered, size of ablation zone appears to be most predictive of recurrence-free survival for those patients treated with RFA for early stage lung cancers.

CLINICAL RELEVANCE/APPLICATION

Post-radiofrequency ablation zones greater than 3-cm were significantly less likely to be associated with recurrent disease, in a multi-institutional prospective study of 50 stage I NSCLC patients.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Damian E. Dupuy, MD - 2012 Honored Educator

VSIO31-08 Lung Tumor Board

Tuesday, Dec. 1 3:30PM - 3:50PM Location: S405AB

Participants
Matthew R. Callstrom, MD, PhD, Rochester, MN (*Moderator*) Research Grant, Thermedical, Inc Research Grant, General Electric Company Research Grant, Siemens AG Research Grant, Galil Medical Ltd

VSIO31-09 Percutaneous Hardware for Bone Metastases-Where and When

Tuesday, Dec. 1 4:00PM - 4:20PM Location: S405AB

Participants
Frederic Deschamps, Villejuif, France (*Presenter*) Research Consultant, Medtronics, Inc

LEARNING OBJECTIVES

1) To understand why cementoplasty alone is not always appropriate for bone fracture management (palliation and/or prevention). 2) To introduce the percutaneous screw fixation technique. 3) To present clinical outcomes of percutaneous screw fixation in bone cancer patients.

ABSTRACT

Bone fractures can result in significant pain and loss of function in cancer patients. Percutaneous screw fixation is a very new technique that consists in the insertion of screws in bone structures through a very small skin incision under imaging guidance. The indications are twofold for bone fracture: palliative and preventive. 1/ For patients suffering from pathological or non-pathological fracture the goal of the screw fixation is to achieve a stabilization of the fracture fragments that will result in pain palliation. Typically, the fractures that can be fixed are located in the sacrum, the iliac crest, the acetabulum roof, the pubic ramus and the proximal femur. Cementoplasty can be performed in association (augmented screw fixation) in order to improve the screw's tip anchorage. 2/ For patients with impending osteolytic metastases, the decision to perform percutaneous augmented screw fixation instead of cementoplasty alone is drone by the fact the strength properties of the cement are strong in compression but weak for tensile or shear stresses. Typically, the impending osteolytic metastases that can be consolidate using percutaneous augmented screw fixation are located in the iliac crest, the acetabulum and in the proximal femur.Percutaneous screw fixation is a very effective tool that must be considered as a part of the therapeutic arsenal of the interventional radiologists. Firstly, because it is a minimally invasive procedure that avoids extensive surgical exposure and secondly because the accuracy provided by CT- or Flat panel- guidances results in high technical success and very low complication rate for the screw placement.

VSIO31-10 Patient Selection and Outcomes with MRgFUS

Tuesday, Dec. 1 4:20PM - 4:40PM Location: S405AB

Participants
Alessandro Napoli, MD, Rome, Italy, (alessandro.napoli@uniroma1.it) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To become familiar with the basic principles of HIFU and the potential of MR guidance. 2) To approach selection criteria in MRI screening examinations for accurate indications and identify contraindications and non-suitable patients. 3) To appreciate current results and potential therapy regimens. 4) To understand recent technical developments and their potential.

ABSTRACT

Bone metastases are common in patients with advanced cancer and are the greatest contributor to cancer-related pain, often severely affecting quality of life. Many patients with advanced cancerare undertreated for pain. Radiation therapy (RT), together with systemic therapies and analgesics, is the standard of care for localized metastatic bone pain, although up to two-thirds of patients have residual pain after RT, leaving them with limited treatment options. These include reirradiation, which results in temporary pain reduction in some patients, surgical intervention, and percutaneous cryoablation. More effective systemic therapies are prolonging survival of cancer patients with metastatic disease, resulting in an increased need for alternative therapies for painful bone metastases. Focused ultrasound is a noninvasive technique that delivers acoustic energy to heat lesions focally to ablative temperatures of more than 65°C. The combination of focused ultrasound with magnetic resonance (MR) imaging enables physicians to perform precise localized tumor tissue ablation, while using MR thermometry for real-time temperature monitoring. Clinical studies on the use of MR-guided focused ultrasound surgery (MRgFUS) for palliation of painful bone metastases demonstrated excellent response rates and safety. Results of a randomized controlled trial will be reviewed to discuss safety and efficacy of MRgFUS for treating bone metastases in patients with persistent or recurrent pain after RT, or who were otherwise not candidates for RT, or who declined RT. MRgFUS has several advantages that may positively influence safety and effectiveness compared with other ablative therapies. These include high-resolution imaging of the targeted tumor and nontargeted normal anatomy, intraprocedural MR thermometry accurate within approximately 2° to verify adequate temperatures to achieve ablation while respecting normal tissue tolerances, and immediate post-treatment validation of the extent of ablation.

VSIO31-11 Minimally Invasive Treatment of Osteoid Osteoma: Experience of a Single Center Using MR Guided Focused Ultrasound Surgery (MRgFUS) or Radiofrequency Ablation (RFA)

Tuesday, Dec. 1 4:40PM - 4:50PM Location: S405AB

Participants
Francesco Arrigoni, Coppito, Italy (*Presenter*) Nothing to Disclose
Alice La Marra, MD, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose
Silvia Mariani, MD, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose
Luigi Zugaro, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose
Antonio Barile, MD, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose
Carlo Masciocchi, MD, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate effectiveness and safety of minimally invasive treatment of Osteoid Osteoma (OO) with ablation techniques: Magnetic Resonance guided Focused Ultrasound Surgery (MRgFUS) and Radiofrequency Ablation (RFA).

METHOD AND MATERIALS

From March 2011 to March 2014 we treated 40 OO, 18 with MRgFUS (ExAblate InSightech, Israel) and 22 with RFA (Needle Electrode, Boston Scientific-USA). For each patient we chose the less invasive treatment, when applicable. When the lesion could be easily reached with the US beam, the patient was treated with MRgFUS; otherwise, the patient was treated with RFA. Sixteen OO were treated with MRgFUS in the lower arm and 2 in the uppers. The treatments lasted a mean time of 110 minutes. The lesions treated with RFA were 18 in the lower extremities, 2 in the upper ones and 2 in the vertebral body. They were treated in less than 100 min. The follow-up was performed by MRI and CT up to a maximum of two years; the clinical evaluation was performed using the visual analogue scale (VAS).

RESULTS

All patients, except one treated with MRgFUS and subsequently re-treated with RFA, showed a regression of painful symptomatology. After treatment, they no longer needed any pain medication. The mean hospitalization time was 2 days for patients treated with MRgFUS and 2.4 days for those submitted to RFA. The mean VAS value, 2 years after treatment, showed an overall improvement of 100% (from 8.2 to 0). At the first control at one week after the procedure, patients treated with MRgFUS showed a lower mean VAS value (0.5) as compared with that of RFA (0.8). The results of MRI and CT, 2 years after the treatment, showed in all cases the disappearance of both bone edema (MRI) and nidus with central calcification and peripheral osteosclerosis (CT), that are typical findings of the osteoid osteoma. In no case, major complications were observed.

CONCLUSION

Though based on a limited group of patients, our study demonstrates the safety and effectiveness of both techniques in the treatment of OO, by which it was possible to obtain an optimal clinical and imaging outcome. Compared with RFA, MRgFUS is less invasive, but to be successful, it is mandatory that the US beams properly reach the region of interest.

CLINICAL RELEVANCE/APPLICATION

To evaluate safety and efficacy of an innovative technique of ablation, MRgFUS, which promises to be even less invasive than RFA, which is currently the gold standard in the treatment of OO.

VSIO31-12 Spine Metastases Palliation-Ablation Stabilization

Tuesday, Dec. 1 4:50PM - 5:10PM Location: S405AB

Participants
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1. Learn the basics of ablative technologies available for use in the spine and sacrum. 2. Define current indications for percutaneous ablation in the Spine and Sacrum. 3. How we do it. Lessons learned and resources needed. 4. Define local control rates for the varied tumors treated. 5. Discuss our experience with palliative outcomes for pain relief. 6. Limitations of ablation in the neurosis. 7. Postablative kyphoplasty/verterboplasy. 8. Discuss unique considerations for cervical, thoracic, lumbar spine and sacrum.

ABSTRACT

Oligometastatic disease involving the spine and sacrum is growing due to an aging population as well as improved survival rates of varied primary malignancies. 70% of all cancer patients will have metastatic disease with 40% involvement of the neuroaxis and 20% with epidural disease. While radiation therapy continues to be the primary treatment a subset of tumors are not radiosensitive and of those which are there are non responders. Starting in 2009 this clinical need led us to develop an ablation service dedicated to the spine and sacrum to aid in the treatment of oligometastatic disease. This talk will enable the attendee to learn the basics of ablative technologies in the spine and sacrum. Learn current indications for this technologies. Learn "how we do it" including lessons learned and resources need to perform this type of treatment. We will discuss the role of post ablative kypholplasty/vertebroplasty. Finally we will review our palliative pain relief results as well as local control rates in the increasing types of tumors treated.

VSIO31-13 Ablation is Front-line Therapy for Desmoid Tumors

Tuesday, Dec. 1 5:10PM - 5:30PM Location: S405AB

Participants
Afshin Gangi, MD, PhD, Strasbourg, France (*Presenter*) Nothing to Disclose

Handout:Afshin Gangi

http://abstract.rsna.org/uploads/2015/15003113/desmoid.pptx

VSIO31-14 CT-guided Cryoablation as Single Treatment or Combined with Radiotherapy in the Management of Bone and Soft Tissue Lesions

Tuesday, Dec. 1 5:30PM - 5:40PM Location: S405AB

Participants
Francesco Arrigoni, Coppito, Italy (*Presenter*) Nothing to Disclose
Silvia Mariani, MD, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose
Alice La Marra, MD, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose
Luigi Zugaro, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose
Antonio Barile, MD, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose
Carlo Masciocchi, MD, L'Aquila, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate safety and efficacy of percutaneous CT-guided cryoablation, performed with multiple cryoprobes (also in combination with Radiotherapy) in the treatment of bone and soft tissue lesions.

METHOD AND MATERIALS

Up to April 2015, we treated 27 patients with percutaneous CT-guided cryoablation. All patients but one had osteolytic bone metastases; one patient had a recurrence of aggressive fibromatosis of the shoulder.Prior to treatment, the patients were evaluated with the VAS questionnaire for pain which resulted in a mean value of 7.6.For a faster and more comfortable procedure, we employed three to six cryoprobes for each lesion under fluoroscopic guide. The area of cryoablation (iceball) and the position of the cryoprobes were controlled during the procedure with a wide-volume acquisition, employing 3D and MPR reconstruction. Follow-up studies at 3 and 6 months were performed with CT and VAS questionnaire. No major complications occurred during the procedures.

RESULTS

We observed a reduction of pain in all patients. The mean VAS value dropped from 7.6 to 1.6 one week after treatment and remained substantially unchanged until the end of follow-up (6 months).CT follow-up showed progression of the disease in no case. Only size reduction or stationary CT findings were observed.

CONCLUSION

Our results show the effectiveness of cryoablation, particularly in combination with RT, in terms of tumoral mass control and particularly of pain relief. Through thermoablation in fact it is possible to obtain a prompt relief of pain, and enhancement of the

quality of life immediately after the treatment. The main advantages are the possibility to treat the whole lesion at the same time with the use of multiple cryoprobes and to check in real time the treated volume; the main limitations are represented by the low number of patients recruited and by the length of the follow-up.

CLINICAL RELEVANCE/APPLICATION

To evaluate safety and effectiveness of cryoablation also in combination with RT in the management of painful bone and soft tissue lesions, with the aim of reducing tumoral mass and pain.

VSIO31-15 Bone Metastases Tumor Board

Tuesday, Dec. 1 5:40PM - 6:00PM Location: S405AB

Participants
Matthew R. Callstrom, MD, PhD, Rochester, MN (*Moderator*) Research Grant, Thermedical, Inc Research Grant, General Electric Company Research Grant, Siemens AG Research Grant, Galil Medical Ltd

RCA34

Using RSNA Clinical Trial Processing (CTP) Software for De-identification and Data Sharing (Hands-on)

Tuesday, Dec. 1 2:30PM - 4:00PM Location: S401AB

IN RS

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Justin Kirby, Bethesda, MD (*Presenter*) Stockholder, Myriad Genetics, Inc
Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Stockholder, Evidentia Health, Inc; Stockholder, OneMedNet Corporation; Stockholder, VoiceIt Technologies, LLC
Kirk E. Smith, BS, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn about CTP's capabilities and the unique challenges associated with de-identifying DICOM images 2) Learn how to install the CTP software 3) Learn how to use Pipelines to quickly configure CTP for data sharing and clinical trial use cases 4) Learn how to customize de-identification scripts for advanced use cases

ABSTRACT

The RSNA Clinical Trials Processor (CTP) is free software that enables researchers to share data for imaging clinical trials and research projects. CTP provides a secure end-to-end solution for efficiently de-identifying and moving images and related data between clinical trial sites or research teams. CTP is designed to support industry-standard Digital Imaging and Communications in Medicine (DICOM) transport protocols, so it is easy to configure CTP to work with commercial PACS systems as well as research databases such as DCM4CHEE, NBIA, MIDAS or XNAT. Built-in compliance with DICOM de-identification standards enables easy and effective removal of protected health information while preserving key attributes necessary to maintain usability of the data. In this course participants will be provided with an overview of CTP's functionality and the unique challenges associated with de-identifying DICOM images. They will then perform hands-on image processing of sample data based on common research and clinical trial scenarios.

URL

RCC34

3D Printing with Viable Tissues - Bioprinting

Tuesday, Dec. 1 2:30PM - 4:00PM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Dimitris Mitsouras, PhD, Boston, MA (*Moderator*) Research Grant, Toshiba Corporation; Speakers Bureau, Toshiba Corporation
Roger R. Markwald, PhD, Charleston, SC (*Moderator*) Nothing to Disclose

Sub-Events

RCC34A 3D Printing of Viable Tissues

Participants
Roger R. Markwald, PhD, Charleston, SC (*Presenter*) Nothing to Disclose

RCC34B 3D Printing and Regenerative Medicine in Congenital Heart Disease

Participants
Richard G. Ohye, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the current role for 3-D printing and regenerative medicine in congenital heart disease.

RCC34C Intellectual Property

Participants
Bruce Kline, BS, Rochester, MN (*Presenter*) Nothing to Disclose

RCC34D Quality Control

Participants
Shuai Leng, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

MSRO33

BOOST: Breast-Case-based Review (An Interactive Session)

Tuesday, Dec. 1 3:00PM - 4:15PM Location: S103AB

BR RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Steven J. Chmura, MD, PhD, Chicago, IL (*Presenter*) Nothing to Disclose
Nora M. Hansen, MD, Chicago, IL (*Presenter*) Speakers Bureau, F. Hoffmann-La Roche Ltd
Karen Y. Oh, MD, Portland, OR (*Presenter*) Nothing to Disclose
Lucy Chen, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Improve basic knowledge and skills relevant to radiation therapy use in breast cancer patients. 2) Apply information learned from provided breast cancer case scenarios to clinical practice. 3) Assess technological innovations and advances which can enhance clinical practice and problem-solving in the breast cancer population. 4) Apply principles of critical thinking to ideas from breast oncology experts and peers in the radiologic sciences.

MSRO36

BOOST: CNS Tumor Board-Case-based Review of PET/MR Imaging and Role in the Clinical Treatment Management of Brain Tumors (An Interactive Session)

Tuesday, Dec. 1 3:00PM - 4:15PM Location: S103CD

NR MR NM RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Christina I. Tsien, MD, Saint Louis, MO (*Moderator*) Speaker Bureau, Merck & Co, Inc
Soonmee Cha, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Michael Vogelbaum, MD, Cleveland, OH (*Presenter*) Stockholder, Infuseon Therapeutics, Inc
Patrick Y. Wen, MD, Boston, MA (*Presenter*) Research support, Agios Pharmaceuticals, Inc; Research support, Angiochem Inc; Research support, AstraZeneca PLC; Research support, Exelixis, Inc; Research support, F. Hoffmann-La Roche Ltd; Research support, GlaxoSmithKline plc; Research support, Karyopharm Therapeutics, Inc; Research support, Novartis AG; Research support, sanofi-aventis Group; Research support, Regeneron Pharmaceuticals, Inc; Research support, Vascular Biogenics Ltd; Advisory Board, AbbVie Inc; Advisory Board, Cavion; Advisory Board, Celldex Therapeutics, Inc; Advisory Board, Merck & Co, Inc; Advisory Board, F. Hoffmann-La Roche Ltd; Advisory Board, Midatech Pharma; Advisory Board, Momenta Pharmaceuticals; Advisory Board, Novartis AG; Advisory Board, NovoCure Ltd; Advisory Board, Sigma-Tau Pharmaceuticals, Inc; Advisory Board, Vascular Biogenics Ltd; Speaker, Merck & Co, Inc

LEARNING OBJECTIVES

1) Present latest advances in imaging of brain tumors with special emphasis on PET/MR Imaging. 2) Review strengths, pitfalls, and limitations of the advanced imaging methods in a case-based format. 3) Discuss key imaging methods and features to differentiate recurrent tumor and treatment effect and to identify brain tumor mimics.

RC413

Pediatric Series: Abdomen

Tuesday, Dec. 1 3:00PM - 6:00PM Location: S102AB

GI MR US PD

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.50

FDA Discussions may include off-label uses.

Participants
Brian D. Coley, MD, Cincinnati, OH (*Moderator*) Editor with royalties, Reed Elsevier
Oscar M. Navarro, MD, Toronto, ON, (oscar.navarro@sickkids.ca) (*Moderator*) Nothing to Disclose
Ethan A. Smith, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose
Jeanne S. Chow, MD, Boston, MA (*Moderator*) Nothing to Disclose

Sub-Events

RC413-01 Sonography of Neonatal Necrotizing Enterocolitis

Tuesday, Dec. 1 3:00PM - 3:20PM Location: S102AB

Participants
Oscar M. Navarro, MD, Toronto, ON, (oscar.navarro@sickkids.ca) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the limitations of abdominal radiographs in necrotizing enterocolitis. 2) Describe sonographic findings in necrotizing enterocolitis. 3) Define the role of sonography in necrotizing enterocolitis.

ABSTRACT

Necrotizing enterocolitis (NEC) is a relatively common disease affecting neonates, especially preterm infants, but can also be seen in term neonates. Despite the progress in neonatal medicine, it remains associated with significant morbidity and mortality, with reported death rates up to 20-30%.Traditionally, neonatal NEC has been imaged with abdominal radiographs, and in fact radiographic findings are part of the Bell staging clinical criteria. Radiographic assessment mainly relies in the evaluation of the bowel gas pattern and in the detection of extraluminal gas. However, most of the radiographic findings are indirect signs of bowel involvement in NEC or its complications and are not always present even in severe cases.Sonography, which can be done by the bedside and without the need of radiation, has the advantage that allows direct visualization of the bowel wall and can assess for the presence of pneumatosis, changes in wall echogenicity, wall thickening, wall thinning, peristalsis and even wall perfusion, including hyperemia and decrease or absent vascularity, all of which can be signs of NEC. Sonography also allows direct visualization of the peritoneal cavity and may detect complex free fluid and localized fluid collections, more often associated with complicated NEC. Furthermore, sonography may also detect portal venous gas and pneumoperitoneum, the latter indicative of bowel perforation. Therefore, sonography may provide information not available on radiographs and aid in the diagnosis of NEC and detection of complications. For example, sonography may allow diagnosis of bowel necrosis before perforation occurs and pneumoperitoneum becomes evident on abdominal radiographs thus facilitating early intervention.In summary, sonography has at least a complementary role to radiographs and its use may affect management of patients with neonatal NEC and possibly their outcome.

RC413-02 Development of a Near Infra-Red (NIR) Plenoptic Imaging System for Detecting Necrotizing Enterocolitis (NEC)

Tuesday, Dec. 1 3:20PM - 3:30PM Location: S102AB

Participants
Rohan Bhavane, PhD, Houston, TX (*Presenter*) Stockholder, Sensulin, LLC
Zbigniew Starosolski, PhD, Houston, TX (*Abstract Co-Author*) Stockholder, Alzeca Biosciences, LLC
Barbara Stoll, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Alex Kaay, BS, Santa Barbara, CA (*Abstract Co-Author*) Nothing to Disclose
Douglas Burrin, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ananth Annapragada, PhD, Houston, TX (*Abstract Co-Author*) Stockholder, Marval Pharma Ltd Stockholder, Alzeca Biosciences LLC Stockholder, Sensulin LLC Stockholder, Abbott Laboratories Stockholder, Johnson & Johnson

PURPOSE

An early detection of necrotizing enterocolitis (NEC) in premature infants is key in order to reduce morbidity and mortality. Imaging of premature infants is challenging, since transportation outside the NICU and sedation are both unadvisable. We therefore designed a near infra-red (NIR) plenoptic camera system to image premature infants, and a novel liposomal nanoparticle that localizes to NEC lesions upon intravenous injection. This study tested the visualization of NEC lesions in a preterm piglet model.

METHOD AND MATERIALS

The NIR plenoptic camera assembly consists of 3 high-resolution camera CCD detectors mounted on a gantry with 1 axis of rotation with repeatable increment of 0.1 degree. This creates up to 1260 virtual cameras each with a resolution higher than 10 microns (Fig 1.A). Phantoms consisting of a tissue block with capillary tubes filled with the NIR dye - indocyanine green were utilized to fine tune the system for NIR signal detection.For the animal studies, pre term piglets (N=11) were delivered via C-section 2 weeks before reaching full term. The animals were maintained on total parenteral nutrition (TPN) for 2 days after which oral feeds were started.The animals were injected with liposomes containing a NIR dye, indocyanine green, after the oral feeding was commenced. The abdominal region of the animals was imaged at different time points to detect NIR signal.

RESULTS

NIR signal was detected from the location of gastro-intestinal (GI) tract. Animals that developed NEC showed stronger signal than those that did not go on to develop NEC. Figure 1.C shows representative images from a NEC positive and NEC negative animal.

CONCLUSION

The promising results from this preliminary study suggest that NIR optical imaging can aid in early detection of NEC.

CLINICAL RELEVANCE/APPLICATION

NEC is an inflammatory disease of the gastro-intestinal tract that affects pre-term infants. Early detection is critical to reducing mortality. This study reports an NIR imaging method that could be used for early detection of NEC. This technique eliminates the use of radiation, and is conducive to imaging within the NICU, and without the need for sedation.

RC413-03 Effectiveness of a Staged Ultrasound and Magnetic Resonance Imaging Protocol to Diagnose Pediatric Appendicitis

Tuesday, Dec. 1 3:30PM - 3:40PM Location: S102AB

Participants
Thaddeus W. Herliczek, MD, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
David W. Swenson, MD, Brooklyn, CT (*Presenter*) Nothing to Disclose
Elizabeth H. Dibble, MD, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Claudia Cartagena, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Grayson L. Baird, MS, Providence, RI (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The purpose of this study was to establish the effectiveness of a staged ultrasound (US) and magnetic resonance imaging (MRI) algorithm for the diagnosis of pediatric appendicitis.

METHOD AND MATERIALS

A staged imaging algorithm using US and MRI in pediatric patients with suspected appendicitis was implemented at our institution on January 1, 2011, with US as the initial modality, followed by MRI when US findings were equivocal. A search of the radiology database revealed 2180 pediatric patients who underwent imaging for suspected appendicitis, 1,982 (90.9%) of whom where evaluated according to our established imaging algorithm. A review of the electronic medical record (EMR) of all patients was performed. All imaging reports were reviewed and classified as positive, negative or indeterminate/equivocal for appendicitis, and correlated with surgical and pathology reports.

RESULTS

The prevalence of appendicitis in our patient population was 20.5% (407/1982). Ultrasound alone was performed in 1905 patients (96.1%), yielding sensitivity of 98.7% and specificity of 97.1% for appendicitis. An additional 77 patients underwent MRI following equivocal US, yielding an overall staged imaging algorithm sensitivity of 98.2% and specificity of 97.1%. 0.35% of patients experienced false negative results under the staged protocol. The negative predictive value of the staged protocol was 99.5%.

CONCLUSION

A staged protocol of US and MRI for pediatric appendicitis is effective. Our study demonstrates a staged protocol of US and MRI has a sensitivity of 98.2% and specificity of 97.1% for appendicitis in pediatric patients.

CLINICAL RELEVANCE/APPLICATION

We believe staged protocol of US and MRI could supplant other imaging protocols for pediatric appendicitis. Additionally, staged US and MRI is an effective algorithm to assess pediatric appendicitis without the use of ionizing radiation.

RC413-04 Diagnostic Performance of Noncontrast MRI in Pediatric Appendicitis

Tuesday, Dec. 1 3:40PM - 3:50PM Location: S102AB

Participants
Gray R. Lyons, MD,PhD, New York, NY (*Presenter*) Nothing to Disclose
Pooja Renjen, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Ashley E. Giambrone, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Debra Beneck, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Arzu Kovanlikaya, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

MRI is increasingly employed as a diagnostic modality for suspected appendicitis in children. However, there is discrepancy as to which MRI sequences are sufficient for safe, timely, and accurate diagnosis. We hypothesized that diffusion weighted imaging (DWI) in conjunction with T2-weighted sequences are sufficient for diagnosis.

METHOD AND MATERIALS

All MRI examinations (n=112) performed at our institution for the evaluation of appendicitis in children were retrospectively collected for re-evaluation. Exams were re-read by blinded pediatric radiologists first as non-contrast exams, including T2-weighted and DWI sequences, then secondly as contrast exams, including T1-weighted contrast enhanced sequences. Samples were scored as positive, negative, or equivocal for appendicitis, or non-visualized appendix. Findings were compared to pathologic or clinical data in the medical record.

RESULTS

The sensitivity (with contrast: 1.0, without contrast: 1.0) and specificity (with: 1.0, without: 0.98) of the exams were not significantly different. However, the percentage of nondiagnostic scans was higher for noncontrast exams (with: 26.1%, without: 37.7%). To test the role of contrast in improving certainty of interpretation, nondiagnostic without contrast scans were re-read

with addition of contrast sequences. With addition of contrast sequences, the number of equivocal scans was reduced from 10 to 2 (80% RR, 9.1% AR) and the number of non-visualized appendix scans was reduced from 23 to 15 (35% RR, 9.1% AR).

CONCLUSION

In the evaluation of appendicitis in children, non-contrast MRI examinations provide similar sensitivity/specificity to contrast-enhanced examinations, however, the number of nondiagnostic studies is higher without contrast. We propose a scanning algorithm whereby an exam is initialized as a noncontrast study and reviewed by a radiologist for diagnostic quality prior to contrast administration, if necessary. With this approach, fewer children will receive intravenous contrast without deterioration in overall diagnostic quality.

CLINICAL RELEVANCE/APPLICATION

MRI diagnosis of acute appendicitis can be performed without contrast for most patients; injection of contrast can be reserved for only those patients with nondiagnostic noncontrast imaging.

RC413-05 Shear-wave Elastography for Evaluation of Clinically Significant Portal Hypertension and Hepatic Fibrosis in Children

Tuesday, Dec. 1 3:50PM - 4:00PM Location: S102AB

Participants
Hee Mang Yoon, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Young Ah Cho, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ah Young Jung, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jin Seong Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Chong Hyun Yoon, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the correlation among the liver stiffness (LS) measured by shear wave elastography (SWE), clinically significant portal hypertension (CSPH), and degree of hepatic fibrosis in children with liver diseases.

METHOD AND MATERIALS

We evaluated 38 consecutive pediatric patients (mean age, 9.7±4.6 years) who underwent ultrasound SWE and transjugular liver biopsy with hepatic venous pressure gradient (HVPG) measurement between June 2012 and March 2015. The patients had various liver diseases. Clinical and laboratory data were retrospectively collected. CSPH was defined as a HVPG ≥ 10 mmHg. Hepatic fibrosis was evaluated based on METAVIR classification of fibrosis. Linear regression analysis was performed to correlate LS with clinically significant PHT. Kruskal-Wallis test was conducted to correlation between LS and degree of hepatic fibrosis. Diagnostic performance of predicting clinically significant PHT and degree of hepatic fibrosis were assessed based on receiver operating characteristic (ROC) curve.

RESULTS

LS showed moderate to strong positive correlation with HVPG ($r=0.603$, $p<0.001$). On multivariate analysis, LS was a significant associated factor for diagnosis of CSPH (OR =1.275, $p=0.009$). The area of under the curve (AUC) for predicting CSPH was 0.839 ($p<0.001$) and the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) for an LS cutoff value of 19.7 kPa were 77.8%, 93.1%, 77.8%, and 93.1%, respectively. There was a significant positive correlation between hepatic fibrosis and LS ($p=0.007$). The AUC for predicting advanced hepatic fibrosis (METAVIR stage, F3 or F4) was 0.845 ($p<0.001$) and the sensitivity, specificity, PPV and NPV of an LS cutoff value of 16.2 kPa were 78.6%, 87.5%, 78.6% and 87.5%, respectively.

CONCLUSION

LS exhibited significant correlation with HVPG and hepatic fibrosis. Cutoff values for predicting CSPH and advanced hepatic fibrosis were 19.7 kPa and 16.2 kPa , respectively.

CLINICAL RELEVANCE/APPLICATION

Measurement of LS using SWE can be used for noninvasive assessment and monitoring of CSPH and hepatic fibrosis in pediatric patients with various liver diseases.

RC413-06 US Elastography of Liver and Bowel in Children

Tuesday, Dec. 1 4:00PM - 4:20PM Location: S102AB

Participants
Jonathan R. Dillman, MD, Ann Arbor, MI, (jonathan.dillman@cchmc.org) (*Presenter*) Research support, Bracco Group; Research support, Siemens AG

LEARNING OBJECTIVES

1) Compare and contrast the different US elastography techniques that can be used in children. 2) Apply US elastography to the evaluation of the pediatric abdomen.

ABSTRACT

Multiple forms of ultrasound (US) elastography are available on state-of-the-art clinical ultrasound systems. In general, these techniques are based on either strain or shear wave imaging, and they can easily be performed in children. The basic physics behind each type of US elastography will be explained, and specific advantages and disadvantages will be discussed. Applications of US elastography in the evaluation of the pediatric abdomen will be presented, including assessment of the liver (e.g., for detection of parenchymal fibrosis) and bowel (e.g., for detecting fibrosis within segments of intestine affected by Crohn's disease). Recently published investigations related to US elastography in pediatric populations will be highlighted.

RC413-07 Pediatric Hepatobiliary Interventions

Tuesday, Dec. 1 4:40PM - 5:00PM Location: S102AB

Participants
C. Matthew Hawkins, MD, Decatur, GA, (matt.hawkins@emory.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the spectrum of pediatric hepatobiliary disorders in which invasive imaging is required (using vascular and nonvascular interventional techniques). 2) To describe important hepatobiliary disorders where IR plays a central role in patient management (hepatic vascular malformations, vascular shunts, transplant issues). 3) To emphasize collaboration and communication between clinicians, diagnostic and interventional radiology in managing pediatric hepatobiliary disease.

RC413-08 Accuracy of Multi-echo Magnitude-based MRI Proton Density Fat Fraction to Estimate Longitudinal Change in Hepatic Steatosis in Children with Known or Suspected Non-alcoholic Fatty Liver Disease Using MRS as Reference

Tuesday, Dec. 1 5:00PM - 5:10PM Location: S102AB

Participants
Elhamy R. Heba, MBBCh, MD, San Diego, CA (*Presenter*) Nothing to Disclose
Kevin A. Zand, MD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Omid Yeganeh, MD, La Jolla, CA (*Abstract Co-Author*) Nothing to Disclose
Tanya Wolfson, MS, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Gavin Hamilton, PhD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Michael S. Middleton, MD, PhD, San Diego, CA (*Abstract Co-Author*) Consultant, Allergan, Inc Institutional research contract, Bayer AG Institutional research contract, sanofi-aventis Group Institutional research contract, Isis Pharmaceuticals, Inc Institutional research contract, Johnson & Johnson Institutional research contract, Synageva BioPharma Corporation Institutional research contract, Takeda Pharmaceutical Company Limited Stockholder, General Electric Company Stockholder, Pfizer Inc Institutional research contract, Pfizer Inc
Jeffrey B. Schwimmer, MD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Claude B. Sirlin, MD, San Diego, CA (*Abstract Co-Author*) Research Grant, General Electric Company; Speakers Bureau, Bayer AG; Consultant, Bayer AG ; ;

PURPOSE

To assess the accuracy of magnitude-based MRI (M-MRI) proton density fat fraction (PDFF) to estimate hepatic steatosis longitudinal change for two to six echoes in children with known or suspected non-alcoholic fatty liver disease (NAFLD), using magnetic resonance spectroscopy (MRS) as reference.

METHOD AND MATERIALS

This IRB-approved, HIPAA-compliant, single center, retrospective, longitudinal analysis included children with at least two MR visits between 2008 and 2011. Two-dimensional, spoiled gradient-echo unenhanced M-MRI was used to estimate hepatic PDFF. Low flip angle (10°) and repetition times of 120 to 270 ms were used to minimize T1 dependence. To correct for T2* decay, six nominally in- and out-of-phase echoes were obtained. Single-voxel MR spectra (STEAM) were analyzed by an experienced MR spectroscopist (8 cm3 voxel size, right lobe of liver away from artifact and vessels, long TR to avoid T1 dependence, five echoes to permit T2 correction, AMARES algorithm and jMRUI platform for analysis). Three circular regions of interest were placed on fifth-echo MR images on three consecutive slices co-localized to MRS voxel location, and propagated to images for the other echoes. M-MRI estimated PDFF was calculated for each visit from the first two to six echoes using a custom Matlab algorithm. M-MRI PDFF accuracy was assessed by Bland-Altman analysis and linear regression modeling of change in MRS PDFF vs. change in M-MRI PDFF, for each M-MRI method (two to six echoes).

RESULTS

Seventy-two children (158 MR examinations) were included in this analysis (50 M, 22 F; mean body mass index 33.6 ± 6.0 kg/m2; range 46.1 to 23.2 kg/m2). Regression analysis showed close agreement between change in M-MRI PDFF and change in MRS across all methods, with slope and intercept ranges for two to six echoes of 1.02 - 1.04 and 0.008 - 0.017%, respectively (close to the slope and intercept of the identity line), and R2 ranging from 0.93 to 0.95.

CONCLUSION

In comparison to MRS, M-MRI PDFF using two to six echoes provides an accurate estimate of hepatic steatosis change in children with known or suspected NAFLD.

CLINICAL RELEVANCE/APPLICATION

M-MRI PDFF may be used to evaluate hepatic steatosis changes in children since it shows strong agreement with MRS PDFF.

RC413-09 Superb Microvascular Imaging for the Detection of Parenchymal Perfusion in Undescended Testes in Young Children

Tuesday, Dec. 1 5:10PM - 5:20PM Location: S102AB

Participants
Mi-Jung Lee, MD, PhD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Yong Seung Lee, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Myung-Joon Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyun Joo Shin, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Superb Microvascular Imaging (SMI) is a novel, highly sensitive technique that can detect low velocity microvascular flow. The purpose of this study was to evaluate differences in perfusion of undescended testes (UDT) compared with normal testes in young children using this technique.

METHOD AND MATERIALS

We prospectively performed testicular ultrasonography including Power Doppler Imaging (PDI) and SMI in young children. The diagnosis of UDT or normal testes was determined according to physical examination by experienced pediatric urologists. Testicular size, volume, and microvascular flow for each testis were evaluated by both PDI and SMI. Microvascular flow was categorized into four grades: grade 0, no detectable intratesticular flow; grade 1, one or two focal areas of flow; grade 2, one linear or more than two focal areas of flow; and grade 3, more than one linear flow. Statistical analysis was performed to compare the differences between undescended and normal testes.

RESULTS

We imaged 40 testes from 20 boys (age, 2-29 months). Eleven boys had normal testes, seven had unilateral UDT, and two had bilateral UDT. The mean age was younger in boys with UDT (7.8 vs. 15.9 months, $p < 0.001$). Testis sizes and volumes were similar between the 29 normal and 11 UDT. However, SMI, but not PDI, detected differences in flow grades between the groups ($p < 0.001$). In univariate analysis, age (odds ratio [OR], 0.829; $p = 0.012$) and low grade flow on SMI (OR of grade 0, 51.886 with $p < 0.001$ and OR of grade 1, 14.29 with $p = 0.017$) were associated with UDT. These parameters were also significant in multivariate analysis (area under the curve, 0.892).

CONCLUSION

This study demonstrated decreased perfusion in the UDT in young children using SMI, which can be helpful for visualizing microcirculation and informing prognosis.

CLINICAL RELEVANCE/APPLICATION

Superb Microvascular Imaging (SMI) can demonstrate microcirculation that cannot be detected using conventional Doppler imaging in young children with undescended testes.

RC413-10 Assessment of Pediatric Hydronephrosis via Quantitative Ultrasound Imaging

Tuesday, Dec. 1 5:20PM - 5:30PM Location: S102AB

Participants
Juan Cerrolaza, PhD, Washington, DC (*Abstract Co-Author*) Nothing to Disclose
Nora Lee, Washington, DC (*Abstract Co-Author*) Nothing to Disclose
Craig A. Peters, MD, Washington, DC (*Abstract Co-Author*) Nothing to Disclose
Marius G. Linguraru, DPhil, MS, Washington, DC (*Presenter*) Nothing to Disclose

PURPOSE

To create new ultrasound (US) based quantitative imaging (QI) biomarkers of pediatric hydronephrosis (HN) to identify thresholds of safety for the hydronephrotic renal units where diuretic nuclear renography could be avoided.

METHOD AND MATERIALS

The retrospective dataset (IRB approved) consists of 50 patients (mean age 9.6 months; range 0-168 months) of variable severity (grade 1 to 4 according to the Society for Fetal Urology HN scale (SFU-HS)) with concurrent renal 2DUS imaging and diuretic renography (MAG-3). Mean differential uptake was: 49% (range 14-100%). Mean washout half time (T1/2) was: 37.3 min. (range 3 to >120 min.). Manual segmentation of renal parenchyma (RP) and collecting system (CS) was performed for calibration and algorithm development. 131 morphological parameters were computed (e.g. RP and CS size, curvature). Based on these parameters, machine learning techniques (support vector machines) were used to identify critical cases based on different T1/2 thresholds that would be clinically relevant at 20, 30 and 40 min. A best-fit model was derived for each threshold using optimal morphological parameters to categorize the renal units and receiver operating characteristic curve analysis was performed. For comparison similar thresholding was performed using the SFU-HS and the HN Index (HI).

RESULTS

For T1/2 thresholds of 20, 30 and 40 min. and at 100% sensitivity, the specificities were QI: 94, 70 and 74%, SFU-HS: 0, 39 and 33%, and HI: 52, 47, and 62%, respectively. Area under the curve values were QI: 0.98, 0.94 and 0.94, SFU-HS: 0.74, 0.78 and 0.88, and HI: 0.77, 0.78, and 0.80, respectively. The improvement obtained by the QI method was statistically significant ($p < 0.05$ in all the cases using McNemar's statistical test).

CONCLUSION

QI analysis of renal US allows to identify thresholds of clinically significant T1/2 with 100% sensitivity and clinically acceptable specificity. This technology can potentially and safely reduce the number of MAG-3 scans between 50 and 62%.

CLINICAL RELEVANCE/APPLICATION

QI analysis of renal US demonstrates higher diagnostic power than SFU-HS and HI, having the potential to provide robust assessment of HN non-invasively, minimizing the use of ionizing tests and reducing clinical cost.

RC413-11 Comparison of Contrast-enhanced Voiding Urosonography (ceVUS) in Infants and Children Using Optison to Conventional Fluoroscopic Voiding Cystourethrography (VCUG): Preliminary Results

Tuesday, Dec. 1 5:30PM - 5:40PM Location: S102AB

Participants
Carol E. Barnewolt, MD, Boston, MA (*Presenter*) Nothing to Disclose
Jeanne S. Chow, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Catherine Stamoulis, PhD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Harriet J. Paltiel, MD, Boston, MA (*Abstract Co-Author*) Equipment support, Koninklijke Philips NV

PURPOSE

ceVUS is a radiation-free technique currently used in some European centers for diagnosis of vesicoureteral reflux (VUR) in children, but has not been adopted in the USA. There are no reports on the use of Optison, a second-generation US contrast agent available in the USA, for diagnosis of VUR. This study compares our early experience using Optison for ceVUS to conventional VCUG.

METHOD AND MATERIALS

We retrospectively reviewed 48 patients who underwent ceVUS with Optison immediately followed by VCUG for evaluation of fetal hydronephrosis (24), febrile UTI (16), solitary functioning kidney (5), urethral valves (2) and family history of VUR (1). 24 males and 24 females ranged in age from 2 days-10 years, median 5 months, (25th, 75th) quartiles (1.0, 11.5 months). Optison doses ranging from 0.125-1.25 cc were injected into 250 cc of saline and instilled via gravity through a urethral catheter into the bladder. Image clips of bladder, ureters and kidneys were obtained during bladder filling and voiding. Patients voided around the catheter and transperineal urethral images were obtained. A conventional VCUG was then performed. Studies were reviewed for presence of VUR. VUR grading for ceVUS was into the ureter (1), renal collecting system (2), upper tract dilation (3); for VCUG the International Grading system (I-V) was used.

RESULTS

No adverse events related to Optison occurred. Optimal visualization of the urethra, bladder and upper tracts during ceVUS was achieved with a contrast dose of 0.15 cc. Urethral images were obtained in 40/48 patients, with urethral anatomy well shown in all 40 (21M, 19F). Both studies were negative for VUR in 77/96 kidneys (80%), both positive in 7/96 (7%). In 12/96 (13%), ceVUS was positive and VCUG was negative. VUR by ceVUS was grade 1 (0), grade 2 (8), grade 3 (11). VUR by VCUG was grade I (0), grade II-III (2), grade IV-V (5). Compared to VCUG, ceVUS had a sensitivity for detection of VUR of 100% and specificity of 86%.

CONCLUSION

ceVUS with Optison was easily performed and well tolerated, with high sensitivity and relatively high specificity for diagnosis of VUR compared to VCUG, but without the need for ionizing radiation.

CLINICAL RELEVANCE/APPLICATION

The high-sensitivity, safety, and ease of performance of ceVUS using the US contrast agent Optison has the potential to largely replace conventional fluoroscopic VCUG for diagnosis of VUR which requires exposure to ionizing radiation. Further study is needed.

RC413-12 Pediatric Hypertension - The Radiologist's Role

Tuesday, Dec. 1 5:40PM - 6:00PM Location: S102AB

Participants
Ethan A. Smith, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Have a broad understanding of causes of hypertension in children. 2) Understand the basic pathophysiology behind renin mediated hypertension. 3) Be familiar with the different imaging modalities available to evaluate suspected renin-mediated hypertension and to understand the advantages and limitations of these modalities.

ABSTRACT

Unlike adults, hypertension in children is most commonly secondary to an underlying condition. Renovascular hypertension accounts for between 5-10% of cases of pediatric hypertension and presents clinically with significantly elevated blood pressure, usually refractory to multiple medications. Renovascular hypertension is also associated with a variety of genetic syndromes, including neurofibromatosis type 1 and Williams syndrome. In patients with clinically suspected renovascular hypertension, imaging is employed to confirm the diagnosis, to characterize the renovascular abnormality and to guide surgical or endovascular therapy. Ultrasound with Doppler is the most frequently used initial imaging test, but has historically been thought to be unreliable due to suboptimal sensitivity and specificity. Computed tomography angiography (CTA) and magnetic resonance angiography (MRA) are both useful in the evaluation of suspected renovascular hypertension in adults, but may be less useful in children due to the frequency of intra-renal vascular abnormalities in children which are difficult to resolve with non-invasive imaging. Catheter based digital subtraction agiography remains the gold standard imaging test because of its superior temporal and spatial resolution, allowing for excellent visualization of both extra-renal (aorta, main renal artery) and intra-renal vascular lesions. It is important for the diagnostic radiologist to understand the differences between pediatric and adult renovascular hypertension, and to understand the strengths and weaknesses of the different imaging modalities available, in order to help guide the treatment of these patients.

MSAS34

Developing the Hybrid Technologist in US and Canada (Sponsored by the Associated Sciences Consortium) (An Interactive Session)

Tuesday, Dec. 1 3:30PM - 5:00PM Location: S105AB

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Lynne Roy, MBA, MS, Los Angeles, CA (*Moderator*) Nothing to Disclose
Steven P. DeColle, Edmonton, AB (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Attendees will learn the additional curriculum that is needed to formally educate technologists who operate hybrid equipment. 2) Attendees will be able to compare educational practices in the United States and in Canada. 3) Attendees will understand the opportunities and challenges that certified technologists face when cross training in different imaging disciplines and will be able to proactively mitigate some of these hurdles.

ABSTRACT

Imaging technology is evolving faster than we can develop technologists to competently perform molecular and cross sectional imaging. Both Canada and the United States have designed curriculum that address these essential learning modules. These two educational models will be compared, contrasted, and discussed in detail.In addition, the practicing techologist must be given an opportunity to learn this new technology and to safely and effectively operate it to deliver the necessary information so that the patient can reap the benefit of this technology. This path can be challenging but if undertaken in a planned fashion, and using lessons from the field to mitigate hurdles, on the job training can produce very competent, dual licensed and credentialed individuals.

Sub-Events

MSAS34A Educating the Technologist for Future Practice -The United States Perspective

Participants
David Gilmore, MS, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSAS34B Lessons from the Field: Becoming a Hybrid Technologist

Participants
Mark C. Hyun, ARRT, Los Angeles, CA, (mark.hyun@cshs.org) (*Presenter*) Technical Consultant, Astellas Group; Speakers Bureau, Astellas Group

LEARNING OBJECTIVES

View learning objectives under main course title.

Active Handout:Mark C. Hyun

http://abstract.rsna.org/uploads/2015/15002395/Active MSAS34B.pdf

MSCC34

Case-based Review of Nuclear Medicine: PET/CT Workshop-Lymphoma/Melanoma/Sarcoma (In Conjunction with SNMMI) (An Interactive Session)

Tuesday, Dec. 1 3:30PM - 5:00PM Location: S406A

CT NM OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Janis P. O'Malley, MD, Birmingham, AL (*Director*) Nothing to Disclose
Samuel E. Almodovar-Reteguis, MD, Birmingham, AL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss imaging presentation and special considerations when interpreting FDG PET/CT studies for lymphoma, melanoma and sarcoma. 2) Formulate a systematic approach to interpreting PET/CT studies for this patient population. 3) Discuss pertinent correlative findings on CT for each diagnosis on a case by case basis.

ABSTRACT

MSES34

Essentials of Cardiac Imaging

Tuesday, Dec. 1 3:30PM - 5:00PM Location: S100AB

CA CT MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

MSES34A CMR Basics - Patterns of Enhancement

Participants
Nikhil Goyal, MD, Staten Island, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the basic components of a post contrast Cardiac MRI (CMRI) examination. 2) Understand the concept of myocardial nulling and its role in delayed enhancement CMRI. 3) Learn the patterns of delayed enhancement associated with ischemic and nonischemic cardiac disease.

MSES34B Congenital Anomalies of the Coronary Arteries with Pathologic Correlation

Participants
Seth J. Kligerman, MD, Denver, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize various congenital anomalies of the coronary arteries on cross-sectional imaging. 2) Learn which anomalies are benign and which can lead to adverse cardiac events. 3) Understand how anomalies in the origin, course, and termination of the coronary arteries can lead to a abnormal perfusion of the myocardium.

MSES34C Cardiac CT and MRI: Seeing the Unseen

Participants
Musturay Karcaaltincaba, MD, Ankara, Turkey, (musturayk@gmail.com) (*Presenter*) Speaker, General Electric Company; Speaker, Koninklijke Philips NV

LEARNING OBJECTIVES

1) To describe the cardiac CT and MRI findings that can not be seen or characterized by echocardiography and catheter angiography. 2) To depict imaging features of mild atherosclerosis, napkin ring sign, bypass grafts, interatrial septal and myocardial pathologies. 3) To elucidate our understanding of cardiac pathologies (such as fibrosis, iron overload and amyloidosis) than can be diagnosed without biopsy.

RC401

Practical Issues in Chest Imaging (An Interactive Session)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: E353C

CH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC401A A Pattern Based Approach to Acute Parenchymal Opacities

Participants
Amita Sharma, MBBS, Boston, MA, (asharma2@mgh.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) At the conclusion of the session the attendee will be able to identify patterns of acute parenchymal opacities in a patient presenting with acute dyspnea. The attendee will learn to classify the distribution of disease according to the craniocaudal, axial distribution and distribution relative to the secondary pulmonary lobule. They will understand how to describe radiologic abnormalities as air-space opacities, including ground glass and consolidation, nodular opacities, linear opacities and areas of decreased attenuation. This knowledge will enable the attendee to apply a pattern based approach to differential diagnosis of acute parenchymal opacities in their clinical practice. This will enable a more focused differential diagnosis that can be used to direct further evaluation and management.

ABSTRACT

Patients often present to the emergency room with acute dyspnea. The chest radiograph or chest CT scan may show diffuse parenchymal opacities that may be due to a number of etiologies, such as infection, pulmonary edema, or malignancy. By analyzing the distribution of disease, characterizing the most pronounced radiologic abnormalities and incorporating the presence of ancillary findings, it is possible for the radiologist to offer a limited differential diagnosis to direct further evaluation or management. This talk will illustrate the common diseases that present with acute dyspnea and provide practical tips on the approach to diffuse parenchymal abnormalities detected on imaging.

RC401B Unravelling Pulmonary Lymphoproliferative Disorders

Participants
Sam S. Hare, MBBS, MA, London, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe native pulmonary lymphoid tissue with emphasis on MDCT appearances of intrapulmonary lymph nodes. 2) Provide a simple classification system for the pulmonary lymphoproliferative disorder spectrum. 3) Identify the breadth of MDCT patterns associated with pulmonary lymphoproliferative disease. 4) Contrast the imaging manifestations of LIP versus pulmonary lymphoma. 5) Detect key MDCT patterns in secondary pulmonary lymphoma.

ABSTRACT

Pulmonary lymphoproliferative disorders (LPD) comprise a complex group of focal or diffuse abnormalities: benign LPD and primary pulmonary lymphoma are relatively rare whereas secondary pulmonary lymphoma is far more common. Understanding the spectrum of LPD, coupled with the diversity of potential imaging findings, is crucial because the radiologist is often the first to suggest the diagnosis and is therefore pivotal in differentiating these entities. This presentation will discuss practical LPD concepts relevant to everyday chest imaging by reviewing the more commonly encountered CT patterns in this disorder spectrum.

RC401C ICU Radiology

Participants
Matthew D. Gilman, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the anatomic considerations of the more common ICU tubes and lines. 2) Recognize the proper positioning and malpositions of the more common ICU tubes and lines. 3) Understand the techniques of VA and VV ECMO and the implications for imaging.

ABSTRACT

Critical care patients often require invasive support and monitoring devices to support life and direct clinical management decisions. These tubes and lines are among the most common urgent findings in the imaging of the ICU patient. This presentation will illustrate the anatomy, proper positioning, and malpositions of the more common tubes and lines with illustrations and examples. Newer support devices (ECMO) and the potential pitfalls in imaging these patients will also be illustrated.

RC401D Infections in Immunocompromised Hosts: Keeping Pace with the Changing Landscape

Participants
Rachna Madan, MD, Boston, MA, (rmadan@partners.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss spectrum of immunocompromised hosts and infections associated with specific immune deficits. 2) To review clinical presentation, and imaging findings of pulmonary infections with emphasis on immunocompromised hosts. 3) Review imaging signs in infections. 4) Review the role of percutaneous sampling especially in tissue invasive infections where bronchoscopy and bronchial lavage may have low yield. 5) Discuss revised EORTC/MSG criteria for diagnosis of invasive fungal infections. 6) Emphasize diagnostic conundrums such as presence of multiple infectious processes, mimics of infection and immune reconstitution inflammatory syndrome (IRIS). 7) Use case scenarios to illustrate formulation of differential diagnosis by combining clinical, serological data with imaging findings.

ABSTRACT

Infections are the most common pulmonary complications in immunocompromised patients and lung is the most frequently affected site of tissue invasive infection. It is imperative to adopt an aggressive approach to getting specific microbiologic diagnosis. Early cross sectional imaging with CT allows narrowing of differential diagnosis using radiological features and gives clues about the mechanism of spread, possible organism, burden of disease and guides subsequent invasive procedures such as lung biopsy. Imaging signs must be applied with caution and it is important to consider non-infectious etiologies. Pursuit of a unifying diagnosis is not always possible. Multiple infections may co-exist in a single organ. The radiologist must take on the role of an image guided clinician and combine clinical, serological and microbiological data with imaging features in making a diagnosis.

RC402

Strategies for Developing Business Leadership Skills in the Midst of Healthcare Reform Challenges

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S404CD

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Richard Duszak JR, MD, Atlanta, GA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To develop programs to cultivate trainee and practicing radiologist non-clinical interests in practice management, economics, and health policy, and apply newly acquired knowledge and insights into current and future practice. 2) To help radiologists at all levels in both private practice and academic medical centers understand the complex environment in which health care services are delivered and the roles and relationships of various stakeholders including professional societies, private and academic practices, hospitals and health systems, payers, governmental bodies and private sector industry. 3) To guide radiology residency programs in fulfilling new formal residency training requirements in non-interpretative skills as they pertain to healthcare economics and practice management.

ABSTRACT

As healthcare delivery systems undergo rapid and dramatic changes, the need for dynamic physician leadership in both academic and private practice settings has increased. Traditional graduate medical education curricula have often left young radiologists ill-equipped to address complex issues related to practice management, health policy and economics. Given the many leadership opportunities available for practicing radiologists, additional education and training in these areas should enhance their effectiveness as clinical and non-clinical leaders to positively impact healthcare systems through appropriate use and integration of medical imaging. This course is intended to introduce such educational opportunities at the resident, fellow, and practicing radiologist level and share the early experience of several academic and private medical centers in these pursuits.

Sub-Events

RC402A Residency Training Perspective

Participants
Falgun H. Chokshi, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC402B Fellowship Training Perspective

Participants
Raymond W. Sze, MD, Washington, DC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC402C Faculty Perspective

Participants
Frank J. Lexa, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC402D Private Practice Perspective

Participants
Scott M. Truhlar, MD, MBA, Coralville, IA, (smtruhlar@hotmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC403

Predicting Outcome with Cardiac CT - Which Is Best?

Tuesday, Dec. 1 4:30PM - 6:00PM Location: N226

CA CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC403A Calcium Scoring

Participants
John J. Carr, MD, MS, Nashville, TN (*Presenter*) Nothing to Disclose

ABSTRACT

Coronary artery calcifications document the presence of advance atheroma in the coronary arteries. Calcified plaque is the "sclerosis" of atherosclerosis and thus is an established imaging biomarker of coronary artery disease. In this presentation we will review the evidence of CAC supporting application of CT measured CAC as a risk marker of coronary artery disease and evidence-based application for clinical practice and prevention in 2015 and beyond.

RC403B Coronary CT Angiography (CCTA)

Participants
John R. Lesser, MD, Minneapolis, MN, (jrlesser1@gmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) -Review the data predicting cardiac events from information obtained on cardiac CT angiography. 2) -Understand the predictive value of coronary CT angiography in the setting of acute chest pain in the emergency room. 3) -Understand the predictive value of CTangiographic findings in the setting of chronic chest pain. 4.) Review the additional predictive value of coronary CT angiography relative to calcium scoring in symptomatic vs asymptomatic populations.

ABSTRACT

Active Handout:John Raymond Lesser

http://abstract.rsna.org/uploads/2015/15003315/RC403B.pdf

Active Handout:John Raymond Lesser

http://abstract.rsna.org/uploads/2015/15003315/Active RC403B.pdf

RC403C Myocardial Perfusion

Participants
Ricardo C. Cury, MD, Miami, FL (*Presenter*) Research Grant, General Electric Company; Research Consultant, General Electric Company; Research Consultant, Novartis AG; Research Consultant, Heartflow, Inc

LEARNING OBJECTIVES

1) To review the available literature supporting the growing evidence of myocardial perfusion to predict outcomes. 2) To discuss new imaging modalities, such as myocardial CT perfusion, and their current role. 3) To describe the current limitations and challenges of combined CTA/CTP evaluation and its future role.

ABSTRACT

Myocardial perfusion imaging (MPI) is an integral component for the diagnosis and management of patients with coronary artery disease. Single photon emission computed tomography (SPECT) is the most frequently requested and widely available non-invasive MPI modality. Importantly, it provides an accurate assessment of the presence or absence of a myocardial perfusion abnormality, yields incremental prognostic information, and contributes to therapeutic decision making. Coronary CT angiography (CTA) is a non-invasive procedure with high diagnostic performance for the detection and exclusion of obstructive coronary stenosis. While CTA offers high sensitivity and negative predictive value, its specificity and positive predictive value are less robust and indicate a systematic over-estimation of stenosis severity . Further, even for high-grade stenoses correctly identified by CTA, comparison with a fractional flow reserve or SPECT reference standard indicates that more than half do not cause ischemia. These findings have evoked concerns that CTA without adjunctive physiologic data may promote excess referral to invasive angiography and/or revascularization. Stress myocardial CT perfusion (CTP) has been shown to provide a combined assessment of both cardiac anatomy and physiology. Multiple single-center studies have established its feasibility using stress agents such as adenosine, dipyridamole and regadenoson, with similar diagnostic accuracy compared with other techniques, including SPECT, fractional flow reserve, cardiac magnetic resonance imaging, and invasive coronary angiography (ICA). Recent multi-center trials also demonstrated promising results of using combined CTA and Stress myocardial CT perfusion (CTP) for a comprehensive cardiac evaluation.

RC404

Muscle-Tendon-Entheseal Unit: Form, Function, and Dysfunction with Emphasis on MR

Tuesday, Dec. 1 4:30PM - 6:00PM Location: E451B

MK MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Donald L. Resnick, MD, San Diego, CA (*Director*) Nothing to Disclose
Donald L. Resnick, MD, San Diego, CA (*Presenter*) Nothing to Disclose
Mini N. Pathria, MD, San Diego, CA (*Presenter*) Nothing to Disclose
Christine B. Chung, MD, San Diego, CA (*Presenter*) Nothing to Disclose
Brady K. Huang, MD, San Diego, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how variations in the macroscopic architecture of muscle relate to its physiological function, affect its risk of injury, and determine the pathoanatomy and imaging appearance following muscle strain. 2) Understand anatomy and histology of tendon, its normal and abnormal imaging appearances, and common patterns of tendon pathology based on anatomic location. 3) Review the anatomy of the tendon-entheseal unit with emphasis on the types of lesion that affect the region of the footprint, with emphasis on MR imaging.

RC405

Preoperative Brain Tumor Imaging

Tuesday, Dec. 1 4:30PM - 6:00PM Location: N227

NR MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Jay J. Pillai, MD, Baltimore, MD (*Moderator*) Medical Advisory Board, Prism Clinical Imaging, Inc; Author with royalties, Springer Science+Business Media Deutschland GmbH; Author with royalties, Reed Elsevier
Haris I. Sair, MD, Baltimore, MD (*Moderator*) Research support, Carestream Health, Inc

LEARNING OBJECTIVES

1) To understand, based on anatomic considerations, how to localize lesions along the brain surface. 2) To become familiar with DTI techniques, their limitations and their applications to neurosurgical planning. 3) To understand the value of BOLD fMRI in presurgical mapping of brain functional systems and appreciate the types of paradigms that are in clinical use.

ABSTRACT

State-of-the-art preoperative brain tumor imaging will be described from the standpoint of neurosurgical planning. The lectures included in this course will cover gyral and other anatomic considerations for lesion localization, as well as the role that both diffusion tensor imaging (DTI) and blood oxygen level dependent (BOLD) functional MRI (fMRI) play in the delineation of eloquent cortex and white matter tracts. The importance of both DTI and BOLD fMRI in the accurate assessment of brain functional networks will be stressed in the context of presurgical mapping. The value, as well as limitations, of each of these approaches will be discussed.

Sub-Events

RC405A Localization of Lesions Along the Brain Surface

Participants
Thomas P. Naidich, MD, New York, NY (*Presenter*) Nothing to Disclose

RC405B Preoperative Diffusion Tensor Imaging: Toward Improving Neurosurgical Outcomes

Participants
John L. Ulmer, MD, Milwaukee, WI, (julmer@mcw.edu) (*Presenter*) Stockholder, Prism Clinical Imaging, Inc Medical Advisory Board, General Electric Company

LEARNING OBJECTIVES

1) To become familiar with DTI technique, visualization strategies, and limitations, as well as to identify strategies for defining spatial relationshps between lesion borders and functional brain networks in order to guide Neurosurgical decision making.

ABSTRACT

Presurgical mapping has revolutionized the neurosurgical care of brain tumor patients. Maximizing resections more safely can improve the accuracy diagnosis, optimized treatment algorithms, and most importantly, decrease the incidence of devasting postoperative deficits associated with injury to functional brain networks. Presurgical mapping in tumor and epilepsy patients is clearly a multi-parameter process, but diffusion tensor imaging (DTI) has had the most significant impact in reducing postoperative neurological complications and warrants focus. At the same time, the technique is among the available, easy to acquire, and easily translatable to clinical practice. By understanding the DTI technique, data visualization methods, effects of pathological processes, and technical limitations, and combining the DTI data with expertise in functional white matter anatomy, physicians can create patient-specific neurosurgical plans that define spatial relationships between lesion borders and functional brain networks. This, in turn, can impact surgical decision making, guide intraoperative assessments, and improve post-operative outcomes. Through case illustrations, this presentation provides strategies to translate DTI and fiber tracking, with all of their limitations, to clinical presurgical brain mapping. The presentation emphasizes the emerging and powerful clinical application of pre-surgical DTI.

RC405C Identification of Eloquent Cortex Using BOLD FMRI

Participants
Jay J. Pillai, MD, Baltimore, MD (*Presenter*) Medical Advisory Board, Prism Clinical Imaging, Inc; Author with royalties, Springer Science+Business Media Deutschland GmbH; Author with royalties, Reed Elsevier

LEARNING OBJECTIVES

1) Understand the value of Blood Oxygen Level Dependent functional magnetic resonance imaging (BOLD fMRI) in presurgical mapping in patients with resectable brain lesions. 2) Describe the functional systems that can be reliably activated using BOLD fMRI in the clinical setting. 3) Appreciate the types of BOLD fMRI paradigms that are typically utilized for presurgical mapping.

ABSTRACT

This lecture will provide a basic overview of Blood Oxygen Level Dependent functional magnetic resonance imaging (BOLD fMRI) and how it can be used to effectively map eloquent cortex in various functional systems. Specifically, applications of BOLD fMRI to sensorimotor mapping, vision mapping as well as mapping of the language network will be described. The value that clinical BOLD fMRI has added to current state-of-the-art presurgical planning will be emphasized. In particular, the specific value that BOLD fMRI can add to standard structural brain MRI in the setting of resectable brain lesions such as brain tumors that distort classical

functional anatomic landmarks will be discussed.

RC406

Head and Neck College Bowl! (An Interactive Session)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: E450B

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
C. Douglas Phillips, MD, New York, NY (*Presenter*) Stockholder, MedSolutions, Inc Consultant, Guerbet SA
Richard H. Wiggins III, MD, Salt Lake City, UT (*Presenter*) Nothing to Disclose
Lawrence E. Ginsberg, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review important head and neck imaging differentials. 2) Recognize imaging appearances of common head and neck pathologies. 3) Understand important head and neck pathologies relationships to normal anatomy. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

ABSTRACT

A fun and light-hearted review of important head and neck imaging anatomy and pathology important differentials. This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Richard H. Wiggins III, MD - 2012 Honored Educator

RC407

Quality and Safety in GU Radiology: Update on Best Practices, Contrast Material, and Radiation Dose

Tuesday, Dec. 1 4:30PM - 6:00PM Location: E350

GU SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Giles W. Boland, MD, Boston, MA (*Coordinator*) Principal, Radiology Consulting Group; Royalties, Reed Elsevier
Richard H. Cohan, MD, Ann Arbor, MI, (rcohan@umich.edu) (*Presenter*) Consultant, General Electric Company; ; ;
James A. Brink, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the background and current status of best practice clinical and workflow management and its imperitive for improving patient outcomes. 2) To review indications for premedication prior to contrast material administration. To summarize the current understanding of iodinated contrast media nephrotoxicity. To describe common errors made in treating contrast reactions. 3) To understand the requirement to match radiation dose according to the individual patient, clinical question and modality used. To outline meaningful radiation metrics including organ dosages and the overall radiation absorbed to estimate patient risk.

ABSTRACT

BEST PRACTICES: Increasingly medicine is being defined and evaluated based on patient outcomes rather than procedural events. While best practices are evolving and sometimes incomplete, many do exist, yet there is marked departmental variation from one organization to another. This session will outline why and how best practice implementation, particularly as it relates to IV contrast use and radiation dose, is essential to achieve better patient outcomes. This will require evaluation of current practices and comparison to nationally driven guidelines, with subsequent compliance to guidelines where they exist. CONTRAST SAFETY: Some patients have contrast reactions despite premedication. Patients who have repeated reactions in this setting tend to have reactions of similar severity. Studies performed with control groups suggest that there is minimal to no increased risk of contrast-induced renal failure in patients who receive iodinated contrast material; however, the control groups likely included patients at increased risk of acute kidney injury. Some errors treating contrast reactions relate to failure to administer epinephrine or using the wrong dose / wrong route. The act of administering this drug can also be problematic. RADIATION DOSE: In all radiological examinations that utilize x-rays, there are always three important issues that must be taken into consideration. The first relates to the appropriate amount of radiation to be used, which must always explicitly take into account the imaging task at hand as well as the physical characteristics of the patient undergoing the CT examination. The second issue is how to transform the radiation incident on the patient into the organ doses received which are essential to understanding (any) patient risks. The final consideration is to understand the radiological significance of the radiation absorbed by the patient, and to estimate (any) radiological risks, as well as the corresponding uncertainties.

RC408

Emergency Neuroradiology (An Interactive Session)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: E353B

NR ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC408A Imaging of Non-traumatic Intracranial Hemorrhage

Participants
Diego B. Nunez JR, MD, MPH, New Haven, CT, (diego.nunez@yale.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Differentiate the imaging patterns of non-traumatic intracranial hemorrhage on initial presentation. 2) Recognize opportunities for providing a more precise diagnosis based on the initial CT findings. 3) Define and recommend the best additional imaging approach for appropriate patient management.

RC408B Imaging of Spine Infection

Participants
Wayne S. Kubal, MD, Tucson, AZ (*Presenter*) Stockholder, Stryker Corporation; Stockholder, Sarepta Therapeutics Inc; Stockholder, CVS Health Corporation

LEARNING OBJECTIVES

1) Understand how pathophysiology and anatomy determine the imaging appearance of spine infection. 2) Critically assess which imaging options offer the greatest sensitivity for both initial diagnosis and post treatment assessment of spine infection. 3) Be able to differentiate spine infection from common mimics most notably degenerative disease.

RC408C Imaging of Cervical Spine Trauma

Participants
Stuart E. Mirvis, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize circumstances in which MRI is indicated for blunt cervical spine trauma. 2) Be familiar with the spectrum of radiologic findings associated with atlanto-occipital dissociation injuries. 3) Understand similarity in appearance and methods to distinguish stable from unstable hyperflexion injuries. 4) Know association of cervical spine injury patterns with vertebral artery injury.

ABSTRACT

Honored Educators

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Stuart E. Mirvis, MD - 2015 Honored Educator

RC409

Gastrointestinal: CT Colonography (CTC)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: E451A

GI CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC409A Colorectal Cancer Screening and CT Colonography

Participants
Kevin J. Chang, MD, Sharon, MA, (kchang@lifespan.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the epidemiology and pathophysiology of colorectal cancer and justifications for colorectal screening. 2) Identify the targets of colorectal screening and provide the rationale for selective polypectomy. 3) Compare and contrast CT Colonography with other screening options.

ABSTRACT

RC409B Optimizing CTC-based CRC Screening - Programmatic Approach and QA Metrics

Participants
Elizabeth G. McFarland, MD, Saint Charles, MO (*Presenter*) Consultant, Toshiba Corporation

LEARNING OBJECTIVES

1) To review why CTC for screening is valuable for radiology practices. 2) To review the key elements of ACR Practice Parameters for patient preparation and CTC technique. 3) To review current insurance coverage issues and coding for CTC for screening and diagnostic uses. 4) To understand the ACR quality metrics for CT colonography currently in practice.

RC409C Technical Pitfalls at CTC and Problem Solving

Participants
Jessica B. Robbins, MD, Madison, WI, (jrobbins@uwhealth.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify potential technical challenges encountered with CTC. 2) Describe techniques which may optimize colonic preparation. 3) Employ modifications to improve colonic distention in challenging situations.

ABSTRACT

RC409D Interpretative Pitfalls at CTC

Participants
Judy Yee, MD, Clayton, CA, (judy.yee@ucsf.edu) (*Presenter*) Research Grant, EchoPixel, Inc

LEARNING OBJECTIVES

1) To understand the causes of errors of CT colonography interpretation on both 2D and 3D images. 2) To learn the morphologic appearance of pitfalls on CT colonography and their differential diagnosis. 3) To apply strategies to avoid common and uncommon interpretive errors. 4) To apply appropriate techniques to avoid polyp measurement errors on untagged and tagged cases.

ABSTRACT

This presentation will provide a discussion of the causes of errors of interpretation on CT colonography. The appearances of common and common pitfalls will be demonstrated. The differential diagnosis of morphologic types of lesions will be preseted.Accurate lesion measurement is essential for CT colonography since this directly impacts management recommendations. Causes of inaccurate measurements will be reviewed along with strategies as to how to improve measurement accuracy.

RC410

Ultrasound Elastography

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S406B

GI GU HN NR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC410A Thyroid Elastography

Participants
Richard G. Barr, MD, PhD, Campbell, OH (*Presenter*) Consultant, Siemens AG; Consultant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, SuperSonic Imagine; Speakers Bureau, Koninklijke Philips NV; Research Grant, Bracco Group; Speakers Bureau, Siemens AG; Consultant, Toshiba Corporation; Research Grant, Esaote SpA

LEARNING OBJECTIVES

1) Explain the difference between strain and shear wave elastography. 2) Understand the techniques to be able to perform thyroid ultrasound elastography. 3) Apply ultrasound elastography into routine clinical practice of thyroid nodules.

ABSTRACT

Thyroid nodules are very common and work-up of these nodules remains challenging. Fine needle aspiration has been the method of choice for diagnosing suspicious lesions with a sensitivity of 54%-90% and specificity of 60-96% for detection of malignant lesions. Malignant thyroid lesions are statistically stiffer than benign lesions. Ultrasound elastography can assess the stiffness of thyroid lesions. Several studies have been performed evaluating strain and shear wave elastography to characterize thyroid nodules. Strain elastography is qualitative while shear wave elastography is quantitative. These studies suggest that ultrasound elastography may improve sensitivity and specificity of characterizing thyroid lesions over B-mode imaging alone. There is a learning curve for performing adequate thyroid ultrasound elastography. Both cystic lesions and calcified lesions are difficult to evaluate with elastography. There is some overlap of stiffness values between benign and malignant thyroid nodules and elastography should not eliminate biopsy of suspicious lesions based on B-mode imaging. Stiff lesions on elastography should increase the suspicion for malignancy. This presentation will discuss the differences between strain and shear wave elastography, discuss technique and pitfalls in performing the examination, review the literature, and discuss published guidelines.

RC410B Renal Elastography: Where Are We?

Participants
Nicolas Grenier, MD, Bordeaux CEDEX, France, (nicolas.grenier@chu-bordeaux.fr) (*Presenter*) Advisory Board, Supersonic Imagine; Travel support, Guerbet SA

LEARNING OBJECTIVES

1) To become familiar with the advantages and limits of the different elastography technologies applied to kidney. 2) To understand the factors affecting reliability and reproducibility of elasticity measurement within the kidney. 3) To learn about the intrarenal changes responsible for elasticity changes. 4) To learn about the clinical impact of elasticity measurement in renal parenchymal diseases. 5) To learn about the clinical impact of elasticity measurement in renal tumors.

ABSTRACT

Ultrasound elastography is a new imaging technique under development that provides information about renal stiffness. Kidney elasticity quantification with ultrasound should be better performed with a quantitative technique, based on shear wave velocity measurements (ARFI or SSI methods). Kidney stiffness changes can be affected by mechanical factors such as external pressure induced by the probe and intrarenal characteristics such as tissue anisotropy, which is high in renal medulla, vascularization, which is high within the cortex, and hydronephrosis. Chronic kidney disease (CKD) incidence and prevalence are increasing in Western countries, due particularly to diabetes mellitus and hypertension-related nephropathies. During progression of such renal parenchymal diseases, cellular density may increase, mainly during acute inflammatory phases, and the interstitial matrix may be invaded by fibrosis. All components of these tissue changes may induce an increase of renal elasticity which is not specifically related to fibrosis. Tubular, glomerular, interstitial and vascular changes may also be responsible for an increase of stiffness. This is why, further studies are now necessary before to understand the real impact of elastography measurement in clinical nephrology. Considering characterization of renal tumors with elastography, clinical experience is still limited. Preliminary results show that benign tumors seem to have lower values of elasticity than malignant ones, but, here too, more experience is also necessary.

RC410C Liver Elastography

Participants
Paul S. Sidhu, MRCP, FRCR, London, United Kingdom, (paulsidhu@nhs.net) (*Presenter*) Speaker, Bracco Group; Speaker, General Electric Company

LEARNING OBJECTIVES

1) To understand the concept of liver fibrosis grading and the implications for healthcare management. 2) To review the basis for the assessment of liver fibrosis using elastography, with emphasis on the different techniques. 3) To understand the differences in the techniques and the variability in measurement assessment. 4) To achieve an overview of the need and position of this technique in clinical care.

ABSTRACT

Liver fibrosis and cirrhosis from many causes is an important cause of long term morbidity and mortlaity. Most cases are a consequence of chronic viral disease (Hepatitis B and C) with alcoholic lever disease an important ethiological factor. The degree of liver fibrosis, and the presence of established cirrhosis confer differnet mamangement stratergies, with imaging playing an important role in the non-invasive assessment of patents with chronic liver disease. Fibrosis grading traditionally performed using the Metavir or Ishak scoring system is essentially a hiistological grading system. Ultimately the possibility to avoid a liver biopsy is the aim, if a non-invasive technique can stage the grade of fibrosis, establishing correct patient management. Liver ultrasound elastography is a developing technique that offers this possibility, with varying methods of aassessment ranging form strain methods and shear wave methods. These techniques will be explained, the status of the current standing of the techniques will be summarised, and the level of technology offered by differnet machines will be reviewed. An overall summary of the current status and the implications for clinical practice will be discussed.

RC411

Update on Radionuclide Therapies

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S504CD

IR NM OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC411A New Guidelines for I-131 Therapy of Thyroid Cancer

Participants
Don C. Yoo, MD, Providence, RI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe why thyroid cancer is increasing. 2) Review guidelines for the use of I-131 in the treatment of thyroid cancer. 3) Review the controversies in thyroid cancer treatment.

ABSTRACT

The purpose of this educational activity is to review the reasons why the incidence of thyroid cancer has risen so rapidly over the last 40 years and discuss the role of radioiodine ablation in patients with thyroid cancer. Issues that will be discussed include controversies in the extent of thyroid surgery and the appropriate use of radioiodine ablation in patients with thyroid cancer which is controversial in low risk and intermediate risk patients. The incidence of thyroid cancer in the United States has almost tripled since the early 1970s with unchanged mortality principally due to overdiagnosis. The extent of surgery performed for thyroid cancer is controversial especially in small cancers but only patients with complete thyroidectomy are candidates for radioiodine ablation. Recently lower doses of I-131 have been shown to be effective for radioiodine ablation of remnant thyroid tissue after thyroidectomy. High risk patients will benefit from radioiodine ablation with decreased recurrence and improved mortality. Radioiodine ablation in low risk patients is very controversial and has not been shown to improve mortality.

RC411B Ra-223 Therapy for Bone Metastases

Participants
Eric M. Rohren, MD, PhD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

Radium-223 is a recently approved therapy for patients with metastatic prostate cancer to bone. The use of radium-223 is increasing worldwide, and new applications are being evaluated. The objectives of this presentation are: 1) Review the chemistry and mechanism of action of Ra-223. 2) Understand the approved indications for Ra-223. 3) Illustrate the techniques and procedures for radium administration using a case-based approach.

ABSTRACT

Radium-223 is an alpha-emitting radiopharmaceutical approved for use in men with castration-resistant prostate carcinoma. THe use of radium in a clinical setting will be discussed, including the rationale, patient eligibility, administration, and follow-up, as well as radiation safety precautions and handling. Illustrative cases will be presented.

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Eric M. Rohren, MD, PhD - 2015 Honored Educator

RC411C Hepatic Artery Infusion Therapy with Y90 Microspheres

Participants
Charles Y. Kim, MD, Durham, NC, (charles.kim@duke.edu) (*Presenter*) Research Grant, Galil Medical Ltd; Consultant, Kimberly-Clark Corporation; Consultant, Cryolife, Inc

LEARNING OBJECTIVES

1) Review range of malignancies treated with Y90 microsphere infusion. 2) Discuss the types of Y90 therapy and dosimetric considerations. 3) Describe the procedures and technical steps involved in Y90 therapy. 4) Recognize pertinent scintigraphic findings associated with Y90 therapy.

ABSTRACT

Intra-arterial Yttrium-90 (Y90) therapy is an important treatment modality for a variety of hepatic tumors. While numerous types of embolotherapies are employed by interventional radiologists for treatment of cancer, Y90 therapy is unique in its multimodality and multi-procedural nature. Not only does this treatment effect rely on deposited ionizing radiation therapy, but scintigraphic imaging is also an integral component of treatment. Two types of Y90 therapies are available, made by two different manufacturers. The

differences between the two types are subtle, but there are differences in administration and manufacturer-recommended dosimetric calculation. These various differences will be highlighted. Y90 therapy is comprised of several steps and is frequently subclassified into a "planning" phase and "treatment" phase. In the planning phase, detailed angiographic imaging is performed to delineate arterial anatomy , determine tumoral distributions, and redistribute vascular flow if indicated. Scintigraphic imaging is an integral component of this planning phase, in order to help identify angiographically occult arterial anomalies, confirm appropriate infusion site, and to quantify the hepatopulmonary shunt fraction. From this information, as well as other factors, the appropriate treatment doses can be determined. In the treatment phase(s), the Y90 dose is administered to the appropriate portions of the liver with subsequent scintigraphic imaging for confirmation.

RC412

Advanced Vascular Imaging Techniques and Applications

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S504AB

VA CT MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC412A Cardiovascular 3D Printing

Participants
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Research Grant, Toshiba Corporation;

LEARNING OBJECTIVES

1) To understand the difference between 3D visualization and 3D printing as related to cardiovascular diagnoses. 2) To review the different 3D printing technologies that have impacted and will impact cardiovascular care. 3) To review the clinical impact of current 3D modelling in both cardiovascular diagnoses and intervention.

ABSTRACT

While advanced visualization in cardiovascular imaging is instrumental for diagnoses and communication with referring clinicians, there is an unmet need to render DICOM images as 3D printed models capable of providing both tactile feedback and tangible depth information of both anatomic and pathologic states. 3D printed models are being rapidly embraced in cardiovascular diagnoses. The purpose of this this lecture is to review and summarize the numerous studies to date that support such benefits from cardiovascular 3D printing, as it is expected that the number of 3D printed models generated from DICOM images for planning intervention and fabricating implants will grow exponentially. 3D printing has closed the gap on the unmet need for true 3D visualization in cardiovascular surgical planning. Source image data is primarily contrast-enhanced MRI and CT. Various approaches have been used to develop a hollow STL model, including segmenting the blood pool and printing vessels with a high-resolution technology to achieve a smooth lumen. Growing data supports the use of models to capture complex anatomy including congenital heart disease requiring surgery. Applications have included acquired cardiac abnormalities such as ventricular aneurysms and cardiac tumors. Models have been useful to plan high-risk valve cases and for intra-operative navigation. Electrocardiographic (ECG) gated CT studies for Trans-catheter Aortic Valve Replacement (TAVR) planning enable 3D printed models of the aortic annulus and surrounding structures for potentially safer valve deployment. Incorporation of patient-specific elasticity of the normal versus calcified aorta will likely be an important area of future research. Models of the aorta and other smaller vessels, including the coronary arteries, enable studies of blood flow dynamics that otherwise would not be possible in vivo.

RC412B Renal MRA and Functional MRI

Participants
Ulrike I. Attenberger, MD, Mannheim, Germany (*Presenter*) Research Consultant, Bayer AG

LEARNING OBJECTIVES

1) To describe the technical pre-requisites for successful contrast and non-contrast-enhanced renal MRA (i.e. signal-to-noise-ratio, scan time, spatial resolution, voxel size). 2) To review contrast-agent dose optimization strategies. 3) To understand the basics of functional renal MR imaging techniques and to illustrate their potential implications on patient care.

RC412C Functional CTA in Athletes

Participants
Richard L. Hallett II, MD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify anatomic and functional lesions that predispose to vascular entrapment and fibrotic syndromes in athletes. 2) Describe methods to assess vascular entrapment and fibrotic syndromes in athletes using dynamic, functionally challenged CTA and MRA. 3) Describe the imaging findings for diagnosis and follow-up of affected athletes.

ABSTRACT

While exercise is a mainstay in preventing and treating atherosclerotic peripheral vascular disease, some vascular disorders manifest primarily in athletes. Both recreational and competitive athletes are at risk for development of non-atherosclerotic vascular diseases. These disease entities range from iliac endofibrosis in cyclists, popliteal entrapment syndrome in running sports, and thoracic inlet / outlet syndromes in "overhead" athletes. Recently, computed tomography angiography (CTA) and magnetic resonance angiography (MRA) have become valuable diagnostic options for many vascular diseases that can occur in the athlete. Optimum imaging in these disorders requires the ability to tailor the exam protocol to the specific disease entity and vascular territory in question. By combining rapid CT image acquisition with functional, physiologic provocative maneuvers, diagnostic information can be maximized. Newer blood-pool MR contrast agents also allow functional assessment without ionizing radiation exposure.This session will review the pathophysiology, risk factors, diagnosis, and classification of vascular diseases seen in the athlete. Logical protocol development utilizing (when necessary) provocative maneuvers will be reviewed. Interpretation strategies for interacting with these resulting large, dynamic datasets will also be reviewed.

Active Handout:Richard Lee Hallett

http://abstract.rsna.org/uploads/2015/15003230/ACTIVE RC412C.pdf

RC412D Aortic Imaging - Beyond Diameters

Participants
Michael D. Hope, MD, San Francisco, CA, (michael.hope@ucsf.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Explain why imaging approaches beyond assessment of vessel diameter are needed for improved risk stratitifcation of aortic disease. 2) List potential aortic imaging targets for improved evaluation of disease progression. 3) Appraise the merits of advanced aortic imaging techniques including the use of MRI and PET for the evaluation of aortic hemodynamics and vessel wall inflammation.

RC414

Interventional (An Interactive Session)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S502AB

IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Steven M. Zangan, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Rakesh C. Navuluri, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Jeffrey A. Leef, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize vascular and non-vascular conditions and their image-guided treatment in the chest, abdomen and pelvis. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

RC415

Breast MR Imaging (An Interactive Session)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: E450A

BR MR SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC415A Image Quality and Interpretation

Participants
Debra M. Ikeda, MD, Stanford, CA (*Presenter*) Consultant, F. Hoffmann-La Roche Ltd; Consultant, Bracco Group

LEARNING OBJECTIVES

1) To review standard MRI acquisition parameters recommended by ACR Breast MRI BI-RADS. 2) To review MRI Interpretation according to ACR Breast MRI BIRADS terminology.

RC415B MR BI-RADS 3

Participants
Debra L. Monticciolo, MD, Temple, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the current literature for BIRADS 3 in the MR setting. 2) To understand interpretations for which BIRADS 3 would or would not be appropriate.

ABSTRACT

Discussion will include the current literature on use of BIRADS 3, with attention to the MR setting. Cases where BIRADS 3 would be considered as well as cases not appropriate for BIRADS3 at MR will be shown.

RC415C Challenging Cases

Participants
Sujata V. Ghate, MD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify challenging cases on breast MRI. 2) Recognize MR imaging findings of unusual breast lesions. 3) Review do's and don't of the breast MRI report. 4) Recommend appropriate management for difficult or esoteric lesions seen on MRI.

ABSTRACT

This lecture will review challenging cases on breast MRI. Participants will learn to identify MR imaging features of common breast diseases, recognize unusual and esoteric lesions, understand the importance of a clear and concise MRI report, and manage difficult cases seen on breast MRI. A total of 12 cases will be reviewed and imaging findings and appropriate management for each case will be discussed. At the conclusion of the case conference, audience participants will have the opportunity to ask questions and discuss unusual cases.

RC416

Service Excellence in Radiology (Sponsored by the RSNA Professionalism Committee) (An Interactive Session)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S103AB

LM PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Kenneth A. Buckwalter, MD, Indianapolis, IN (*Moderator*) Research Grant, Siemens AG
Ella A. Kazerooni, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Brent J. Wagner, MD, Reading, PA (*Presenter*) Nothing to Disclose
Brandon P. Brown, MD, MA, Indianapolis, IN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand who the customer is in Radiology and why customer satisfaction scores are important. 2) Review how Radiology can document the added value role it plays in the enterprise. 3) Discuss how to onboard new staff members successfully

ABSTRACT

ServiceExcellence in healthcare is used generally to refer to patient or customer satisfaction, and our ability tto consistently meet if not exceed the expectations of patients, their families and visitors. It can be more widely expanded to include interactions among staff within a group, across groups or job descriptions or across departments. Inherently it is the concept that healthcare is more than just the technical act of delivering service, in radiology that would be the performance of a diagnostic test for example that hit high marks for classic quality metrics like image quality, radiation dose optimization and clarity and accuracy of the interpretation. Service excellence embraces the notion that healthcare must address the psyche, emotions and worries of those we care for, who come to us for service because they are ill and concerned about their health, the impact of disease on themselves and their families. It is about HOW we deliver the care too. From looking people in the eyes at check in, asking if there is anything else we can do for them, letting then know how they will get their test results, acknoweldging when we can do better without blame, and knowing when and how to say thank you. On a more tangible level, high marks for Service Excellence also translates into higher employee engagement, retention of staff and a drop in time and resources spent doing serivice recovery. Hiring for Service Excellence is important to having the right people in your organization, and sometimes letting those go who cannot live up to those expectations may be necessary to move forward. In the end, a committment to Service Excellence is not about an expensive program delivered by others to you to train to, it is about treating everyone with respect and both setting and often exceeding expectations. With higher patient satifaction scores comes retention of patients/customers, and word of mouth marketing that your programn is THE destination for care now and in future.

Active Handout:Brent Joseph Wagner

http://abstract.rsna.org/uploads/2015/13011742/RC416BW.pdf

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Ella A. Kazerooni, MD - 2014 Honored Educator

RC417

Emerging Breast Imaging Strategies

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S505AB

BR DM MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Catherine J. Moran, PhD, Stanford, CA (*Moderator*) Research support, General Electric Company

Sub-Events

RC417A Diffuse Optical Spectroscopy of Breast Cancer

Participants
David R. Busch, PhD, Philadelphia, PA, (drbusch@sdf.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe light transport through tissue. 2) Describe the current applications of diffuse optics in medicine and technological limitations. 3) Summarize applications of diffuse optics to breast cancer, including cutting edge work and implications for future clinical applications.

ABSTRACT

Diffuse optics utilizes near-infrared light to probe tissue without ionizing radiation. These tools permit rapid and pain-free assessment of endogenous cancer signatures, including oxygenated and deoxygenated hemoglobin, lipid, and water concentrations. Relatively inexpensive instrumentation can monitor the progress of neoadjuvant chemotherapy in a clinic, rather than an imaging suite, using convinient hand-held probes, even in radiologically dense breasts. Very recently, similar optical monitoring tools have been developed to measure microvascular blood flow. More elaborate diffuse optical imaging systems construct three dimensional tomograms of multiple tissue constituants, permitting multi-parameter computer aided detection and localization of tumors.In addition to endogenous chromophores, these optical measurements are exquisitly sensitive to contrast agents, holding significant promise for imaging of highly specific contrast agents at pico- or femto-molar concentrations. Diffuse optical instrumentation can readily be combined with other imaging techinques. These multi-modality data sets provide the opportunity to combine the advantageous aspects of both techniques. We will discuss recent advances in optical monitoring, imaging, and combinations with other modalities.

URL

www.sas.upenn.edu/~drbusch/rsnaHandout-DiffuseOptics-Breast.pdf

RC417B Contrast Enhanced Mammography and Tomosynthesis

Participants
John M. Lewin, MD, Denver, CO (*Presenter*) Consultant, Hologic, Inc; Research Grant, Hologic, Inc; Consultant, Novian Health Inc

LEARNING OBJECTIVES

1) To discuss the indications and utility of contrast-enhanced mammography (CEM) and contrast-enhanced tomosynthesis (CET). 2) To understand the feasibility, limitations, and technical issues of CEM / CET. 3) To compare the utility of CEM and CET against non-contrast techniques and discuss future directions.

Active Handout:John Morton Lewin

http://abstract.rsna.org/uploads/2015/13029341/RC417B.pdf

Active Handout:John Morton Lewin

http://abstract.rsna.org/uploads/2015/13029341/Active RC417B.pdf

RC417C High Resolution Dynamic Contrast Enhanced Breast MRI

Participants
Catherine J. Moran, PhD, Stanford, CA (*Presenter*) Research support, General Electric Company

LEARNING OBJECTIVES

1) Be able to select appropriate spatial and temporal resolution parameters to run a dynamic contrast-enhanced (DCE) breast MRI sequence. 2) Explain to colleagues the difference between temporal resolution and temporal footprint for fast DCE scans. 3) List 3 different approaches to fat suppression, and be able to set up a scan protocol using at least one of these on the learner's scanner.

ABSTRACT

This talk will provide an overview of high-resolution breast MRI techniques. Initially, MRI concepts including parameter tradeoffs, contrast mechanisms, and parallel imaging will be reviewed. Fat suppression techniques are essential for high-quality breast MRI, and include further tradeoffs. Finally, techniques for high spatiotemporal resolution sampling to resolve rapid contrast kinetics while also offering sharp images will be described.

URL

RC418

Imaging of Tumor Syndromes (An Interactive Session)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S103CD

OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC418A Von Hippel Lindau and Other Hereditary Renal Cancer Syndromes

Participants
Peter L. Choyke, MD, Rockville, MD, (pchoyke@nih.gov) (*Presenter*) Researcher, Koninklijke Philips NV Researcher, General Electric Company Researcher, Siemens AG Researcher, iCAD, Inc Researcher, Aspyrian Therapeutics, Inc Researcher, ImaginAb, Inc Researcher, Aura Biosciences, Inc

LEARNING OBJECTIVES

1) To identify the key genetic aspects of von Hippel Lindau (VHL) disease and their relevance to treatment. 2) To distinguish radiologic features of VHL from other hereditary renal cancers. 3) To explain the implications of hereditary renal cancers for sporadic renal cancers.

ABSTRACT

Hereditary renal cancers include clear cell carcinomas associated with von Hippel Lindau Disease (VHL), chromophobe carcinomas associated with Birt Hogg Dube, papillary carcinomas associated with hereditary papillary cancer syndrome and type II papillary carcinomas associated with Hereditary Leiomyoma-Renal Carcinoma (HLRC) syndrome. Additional rare syndromes exist. This talk will focus on the distinguishing features of each entity from a radiologic perspective but also will describe the lexicon underlying the description of the genetics of these entities. This should enable the participant to understand the 'language' of genetics when describing hereditary entities in general, including terms such as tumor suppressor gene, oncogene, hypoxia inducible factor and metabolomics. The participant should come away with a fuller understanding of these hereditary entities and their implications for more common, sporadically occurring renal cancers.

RC418B Neurocutaneous Syndromes

Participants
Petra Vajtai, MD, Portland, OR (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To identify the key distinguishing radiologic features of each of the most common phakomatoses: neurofibromatosis types I and II, tuberous sclerosis, and Sturge-Weber syndrome. 2) To provide guidance on the appropriate use of surveillance imaging in affected individuals.

ABSTRACT

The phakomatoses are a group of hereditary neuroectodermal diseases, each characterized by its unique cutaneous a well as radiologic manifestations. The most common phakomatoses are neurofibromatosis (types I and II,) tuberous sclerosis, and Sturge-Weber syndrome, whose respective characteristic neuroradiological finding is the neurogenic tumor, the tuber and angiomatosis. The talk should enable the participant to distinguish the addressed phakomatoses based on radiologic characteristics, to describe the presentation, diagnosis and prognosis of each, and to provide guidance on the appropriate use of surveillance imaging in affected individuals.

RC418C Multiple Endocrine Neoplasia

Participants
Bryan R. Foster, MD, Portland, OR, (fosterbr@ohsu.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Distinguish between MEN 1, MEN 2A and MEN 2B syndromes. 2) Apply the appropriate modality for specific imaging indications. 3) Describe common and uncommon imaging findings for various tumors seen in MEN.

ABSTRACT

Multiple endocrine neoplasia (MEN) is a heterogenous group of inherited genetic disorders in which patients develop both endocrine and non-endocrine tumors. MEN 1 patients commonly develop pituitary adenomas, parathyroid adenomas and pancreatic neuroendocrine tumors. MEN 2 patients commonly develop meduallary thryoid cancers and pheochromocytomas. Familial meduallary thyroid cancer is also considered part of the MEN syndrome as these patients have mutations in genes similar to MEN 2 patients. Imaging plays an important role in the detection, staging and followup of tumors in these patients and often many different modalities are employed to optimally image these patients.

RC418D Lynch and Other Hereditary Colonic Cancer Syndromes

Participants

Richard Kinh Gian Do, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the advances in genetics for Lynch and other hereditary colonic cancer syndromes. 2) Identify the gastrointestinal and non-GI malignancies of Lynch and other polyposis syndromes. 3) Examine the role of imaging for monitoring hereditary colonic cancer syndromes.

Active Handout:Richard Kinh Gian Do

http://abstract.rsna.org/uploads/2015/13010497/Active RC418D.pdf

RC420

Image-guided Stereotactic Body Radiotherapy (SBRT) for Spinal Metastases - Spinal Imaging, Target Delineation and Post-SBRT Response Evaluation

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S102C

NR OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Simon S. Lo, MD, Cleveland, OH, (Simon.Lo@UHhospitals.org) (*Moderator*) Research support, Elekta AB;

LEARNING OBJECTIVES

1) To understand the basics of stereotactic body radiotherapy (SBRT) for spinal metastasis. 2) To know the basics of diagnostic imaging for spinal metastasis. 3) To learn the principles and methods of target delineation for SBRT for spinal metastasis. 4) To know the principles and methods of response evaluation after SBRT for spinal metastasis.

ABSTRACT

Stereotactic body radiotherapy (SBRT) has become an important treatment modality for spinal metastases in various settings. To facilitate safe and effective delivery of SBRT for spinal metastases, proper pre-SBRT evaluation including appropriate diagnostic imaging, and proper target delineation and contouring of organs-at-risk are necessary. The gold standard for post-SBRT response evaluation for spinal metastases is not well-defined and this is an emerging area of research interest. This refresher course will provide an overview of the spinal SBRT process, diagnostic imaging for spinal metastasis, target delineation for SBRT for spinal metastases, and post-SBRT response evaluation for spinal metastases.

Sub-Events

RC420A Overview of SBRT for Spinal Metastases

Participants
Simon S. Lo, MD, Cleveland, OH (*Presenter*) Research support, Elekta AB;

LEARNING OBJECTIVES

1) To know the indications for stereotactic body radiotherapy (SBRT) for spinal metastasis. 2) To know the technical aspects of SBRT for spinal metastasis. 3) To know the expected outcomes of SBRT for spinal metastasis. 4) To know the potential toxicities of SBRT for spinal metastasis.

ABSTRACT

This subsection will provide an overview of the indications, technical aspects, expected outcomes, and toxicities of stereotactic body radiotherapy (SBRT) for spinal metastasis.

RC420B Pre-SBRT Imaging of Spinal Metastases

Participants
Pejman Jabehdar Maralani, MD, FRCPC, Toronto, ON, (pejman.maralani@utoronto.ca) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the role of different imaging modalities in diagnosis of spinal metastasis. 2) To understand relevant imaging characteristics of spinal metastasis.

ABSTRACT

This section will provide an overview of multiple imaging modalities used for diagnosis and treatment planning of spinal metastasis.

Active Handout:Pejman Jabehdar Maralani

http://abstract.rsna.org/uploads/2015/15002564/Active RC420B.pdf

RC420C Target Delineation of Spinal Metastases

Participants
Kristin J. Redmond, MD, MPH, Baltimore, MD (*Presenter*) Research support, Elekta AB

LEARNING OBJECTIVES

1) To understand target and normal tissue delineation for patients receiving SBRT for malignant spinal metastases.

ABSTRACT

The purpose of this section will be to review principles involved with target and normal tissue delineation in patients being treated with SBRT for malignant spinal metastasis. This will include review of both current consensus guidelines as well as areas of controversy.

Active Handout:Kristin Janson Redmond

http://abstract.rsna.org/uploads/2015/15002565/RC420C RSNA_target delineation_handout_2015.pdf

RC420D Post-SBRT Response Evaluation of Spinal Metastases

Participants
Arjun Sahgal, Toronto, ON, (arjun.sahgal@sunnybrook.ca) (*Presenter*) Speaker, Medtronic, Inc; Speaker, Elekta AB; Medical Advisory Board, Varian Medical Systems, Inc; Speaker, Accuray Incorporated; Research Grant, Elekta AB

LEARNING OBJECTIVES

1) To understand the challenges of post-spine SBRT response assessment. 2) To understand the current state of response criteria consensus.

ABSTRACT

The aim of this presentation is to highlight the challenges of post spine SBRT response assessment, and current consensus work to standardize imaging and evalaution.

RC421

Medical Physics 2.0: Ultrasonography

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S404AB

PH US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ehsan Samei, PhD, Durham, NC (*Director*) Nothing to Disclose
Douglas E. Pfeiffer, MS, Boulder, CO (*Director*) Nothing to Disclose

Sub-Events

RC421A Ultrasonography Perspective

Participants
Paul L. Carson, PhD, Ann Arbor, MI (*Presenter*) Research collaboration, General Electric Company; Research collaboration, Light Age, Inc

LEARNING OBJECTIVES

1) Understand the roles of medical physicists and other providers of ultrasound system QC, performance evaluation and user education. 2) Gain an understanding of the longer term potential of medical ultrasound to aid in medical physics planning and training.

ABSTRACT

A very brief overview is given of the innovations that have led to current medical ultrasound systems and QC thereof. A clear connection to clinical performance/cost effectiveness has not been established, but the ratio is improving. To aid in medical physics planning and training, more distant (beyond 10 years) and less robust predictions are ventured than in Dr. Hangiandreous' talk. The reduction in artifacts and improvement in resolution will be surprisingly large. It is posed that ultrasound will be headed toward almost ubiquitous use in personal hands as well as those of medical personnel, for monitoring and control of chronic conditions, for direct treatment and for precisely localized drug delivery and enhancement of radiation therapy. Medical physicists who can help keep the computer controls integrated, the systems properly calibrated and the users properly trained will find a substantial role in society.

Active Handout:Paul L. Carson

http://abstract.rsna.org/uploads/2015/13010884/RC421A RSNA015RC221AplcTrim2.pdf

RC421B Ultrasonography 1.0

Participants
Zheng Feng Lu, PhD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the current role of ultrasound medical physics in clinical practice. 2) Explain the ultrasound image quality metrics utilized in current ultrasound QA/QC testing. 3) Outline the methods and tools available for ultrasound system QA/QC in current clinical practices. 4) Survey the available standards and voluntary accreditation guidelines for medical ultrasound imaging systems. 5) Understand the need for QC at different levels of time and financial investment.

ABSTRACT

This talk will focus on the present role of ultrasound medical physics in clinical practices. It will review the ultrasound image quality metrics currently utilized in ultrasound QA/QC testing. It will describe testing procedures required and/or recommended by accreditation programs and advisory organizations. General guidelines and available standards will be discussed regarding tolerances for acceptance testing and commissioning of these devices, as well as periodic quality control tests, as applicable to diagnostic B-mode imagers. A brief review of ultrasound phantoms used in these testing procedures will be presented.

Active Handout:Zheng Feng Lu

http://abstract.rsna.org/uploads/2015/13010885/RC421B 20151123-ZFL-Ultrasound_1 0.pdf

Active Handout:Zheng Feng Lu

http://abstract.rsna.org/uploads/2015/13010885/Active RC421B.pdf

RC421C Ultrasonography 2.0

Participants
Nicholas J. Hangiandreou, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the roles expected for medical physics to play in future clinical ultrasound practices. 2) Demonstrate understanding of emerging ultrasound imaging performance metrics that are expected to be in routine practice in the future. 3) Demonstrate understanding of emerging ultrasound imaging technologies that are expected to be in routine practice in the future. 4) Identify approaches for implementing comprehensive medical physics services in future clinical ultrasound practices.

ABSTRACT

Ultrasound imaging is evolving at a rapid pace, adding new imaging functions and modes that continue to enhance its clinical utility and benefits to patients. This talk will look ahead 10-15 years and consider how medical physicists can bring maximal value to the clinical ultrasound practices of the future. The roles of physics in accreditation and regulatory compliance, image quality and exam optimization, clinical innovation, and education of staff and trainees will all be considered. A detailed examination of expected technology evolution and impact on image quality metrics will be presented. Clinical implementation of comprehensive physics services will also be discussed.

Active Handout:Nicholas James Hangiandreou

http://abstract.rsna.org/uploads/2015/13010886/RC421C.pdf

RC422

Proton: Imaging for Treatment Guidance and Verification

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S104A

RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Jon J. Kruse, PhD, Rochester, MN (*Moderator*) Research Grant, Varian Medical Systems, Inc

ABSTRACT

Proton therapy dose distributions are highly conformal and are often used to deliver therapeutic doses to tumors close to critical, radiosensitive normal anatomy. Precise daily reproduction and alignment of the patient anatomy is crucial, then, for successful outcome of proton radiotherapy. This course will describe modern approaches to pre- and intra-treatment imaging to align the patient for proton therapy as well as post-treatment modalities which can verify patient alignment and proton beam range. Pre-treatment image guidance for protons has evolved differently than many common approaches for standard external beam radiotherapy. One reason for this is the dissimilar impact of setup variations on the delivered proton dose distributions, while another is related to the expense of building a proton center and the need to maximize efficiency by moving as many complex processes out of the treatment room as possible. Additionally, the sensitivity of proton dose distributions to intra-fractional changes has led to the development of novel techniques to monitor patient anatomy throughout a treatment. Modest errors in patient positioning or in calculation of proton range could lead to tumor or healthy tissues receiving vastly different doses than were planned. This has led to the development of a number of approaches for post treatment verification of proton beam placement and range. Proton dose verification via positron emission tomography, prompt gamma imaging, and magnetic resonance imaging will be presented.

Sub-Events

RC422A Pre- and Intra-treatment Imaging Strategies for Patient Alignment

Participants
Jon J. Kruse, PhD, Rochester, MN (*Presenter*) Research Grant, Varian Medical Systems, Inc

LEARNING OBJECTIVES

1) Explain the impact of inter- and intra- fractional variations in patient anatomy on proton dose distributions. 2) Describe proton specific approaches to pre-treatment and intra-treatment imaging for patient alignment. 3) Compare various imaging modalities for post-treatment verification of a delivered proton dose distribution.

RC422B Advanced Imaging Techniques for Range Verification

Participants
Thomas R. Bortfeld, PhD, Boston, MA (*Presenter*) Research Grant, Koninklijke Philips NV; Research Grant, RaySearch Laboratories AB

LEARNING OBJECTIVES

1) Explain the impact of inter- and intra- fractional variations in patient anatomy on proton dose distributions. 2) Describe proton specific approaches to pre-treatment and intra-treatment imaging for patient alignment. 3) Compare various imaging modalities for post-treatment verification of a delivered proton dose distribution.

RC423

Molecular Imaging Mini-Course: Clinical Applications of Molecular Imaging - Oncology

Tuesday, Dec. 1 4:30PM - 6:00PM Location: E352

MI OI RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

Sub-Events

RC423A Diagnosis

Participants
Terence Z. Wong, MD, PhD, Chapel Hill, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the potential roles and limitations of PET imaging for amyloid and tau protein in evaluating patients with dementia. 2) Describe anatomic and functional MRI techniques for evaluating Alzheimer's disease. 3) Understand the clinical challenges of diagnosing and managing patients with dementia.

RC423B Staging

Participants
Dominique Delbeke, MD, PhD, Nashville, TN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The potential clinical indications of PET and PET/CT in the evaluation of patients with malignancies. 2) The impact on patient care. 3) Recommendations for PET/CT in the NCCN guidelines.

RC423C Evaluation of Treatment

Participants
David A. Mankoff, MD, PhD, Philadelphia, PA, (david.mankoff@uphs.upenn.edu) (*Presenter*) Speaker, Koninklijke Philips NV; Consultant, General Electric Company

LEARNING OBJECTIVES

1) List applications of quantitative imaigng for clinical trials. 2) Describe the approach to the design of cancer imaging trials. 3) Discuss biomarkers applicationf forf cancer imaging.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

David A. Mankoff, MD, PhD - 2013 Honored Educator

RC424

Histiocytosis from Head to Toe (In Conjunction with the American Institute for Radiologic Pathology)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: N229

OI OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Mark D. Murphey, MD, Reston, VA, (mmurphey@acr.org) (*Moderator*) Nothing to Disclose
Mark D. Murphey, MD, Reston, VA, (mmurphey@acr.org) (*Presenter*) Nothing to Disclose
Jeffrey R. Galvin, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Kelly K. Koeller, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Darcy J. Wolfman, MD, Bethesda, MD (*Presenter*) Nothing to Disclose
Ellen M. Chung, MD, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the typical clinical and pathological features of Langerhans cell histiocytosis. 2) Define the characteristic imaging patterns of Langerhans cell histiocytosis. 3) Understand the pathological basis for the imaging patterns of Langerhans cell histiocytosis.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Mark D. Murphey, MD - 2015 Honored Educator

RC425

Quantitative Imaging Mini-Course: Statistical Analysis/Metrology Issue

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S403B

BQ PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Director*) Institutional research agreement, Siemens AG; Research support, Siemens AG; ; ; ; ;

Sub-Events

RC425A The Role of Metrology in Quantitative Imaging

Participants
Hyung J. Kim, PhD, Los Angeles, CA, (gracekim@mednet.ucla.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the role of QI and its intended application. 2) Understand how to apply a study design for developing, evaluating, and validating a measurement of QI in a targeted population.

ABSTRACT

Many applications of using quantitative imaging biomarkers (QIB) have been reported in numerous scientific domains. Challenges are to obtain a universally consistent terminology or methods in reporting measurement variation of QIB under the various circumstances of scanners, readers, and software. Understanding variation of "measureland" (The quantity intended to be measured (VIM clause 2.3)) in radiological imaging is critical to set a clinically meaningful benchmark of a QI. To estimate a variation of measureland, the study design is a critical basis for developing, evaluating, and validating a QIB using a standard variation metric. Reporting an estimated measurement universally is an initialized step for combining the knowledge across studies and centers as part of evaluation and validation by an independent party. We will discuss the procedure starting from research question, study design, and the corresponding statistical methods toward development, evaluation, and validation of a measurement of QIB in a targeted population.

RC425B Methods for Technical Performance Assessment: What to Assess and How

Participants
Nicholas Petrick, PhD, Silver Spring, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how to apply bias/linearity, repeatability and reproducibility analyses in characterizing the technical performance of a quantitative imaging metric. 2) Understand how technical performance can affect the utility of a quantitative imaging biomarker or Radiomic signature.

ABSTRACT

Developments in extracting biological information from medical images have given rise to a number of proposed quantitative imaging biomarkers (QIBs) and the field of Radiomics. Critical to these research areas is the establishment of accurate and reproducible quantitative imaging (QI) metrics and the establishment of appropriate and widely accepted assessment methods. In this section of the refresher course, we will update the audience on the latest recommendations for assessing the technical performance of individual QI metrics. We will also present an example case in which we assess the technical performance of a lung nodule volume estimation tool.

RC425C Statistical Methods and Principles for Algorithm Comparison Assessment

Participants
Gene Pennello, PhD, Silver Spring, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand objectives of algorithm comparison studies and study design principles. 2) Understand methods for testing hypotheses, estimating performance, and producing descriptive summaries for algorithm comparison. 3) Observe illustrations of how the methods are applied to real data.

Handout:Gene Pennello

http://abstract.rsna.org/uploads/2015/15003205/Gene RSNA 2015 Talk 2015 12 01.pdf

RC427

Lung Cancer Screening: Getting Paid to Do Good

Tuesday, Dec. 1 4:30PM - 6:00PM Location: N228

CH OI HP

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Pamela Kassing, Reston, VA (*Coordinator*) Nothing to Disclose
Pamela Kassing, Reston, VA (*Moderator*) Nothing to Disclose
Geraldine B. McGinty, MD,MBA, New York, NY (*Presenter*) Nothing to Disclose
Ezequiel Silva III, MD, San Antonio, TX, (zekesilva3@gmail.com) (*Presenter*) Nothing to Disclose
Mark O. Bernardy, MD, Conyers, GA (*Presenter*) Nothing to Disclose
Robert K. Zeman, MD, Washington, DC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the current process of how reimbursement for new procedures and technology is obtained from CPT code development, valuation and coverage. 2) Using Lung Cancer Screening as an example, the participants will become familiar with the specific processes for obtaining coverage for new screening programs in the public and private sectors and how a myriad of governmental agencies and other policymaking groups are involved in determining which new procedures are covered. 3) Understand how obtaining coverage will bring this new technology to the mainstream. 4) Interactive techniques will be used to engage the audience in the consideration of strategic partnerships between industry, clinical research, governmental agencies and third party payors.

URL

Handout:Pamela Kassing

http://abstract.rsna.org/uploads/2015/14000570/RSNA2015-PPT slides MOB 11-23 final.pptx

Handout:Ezequiel Silva

http://abstract.rsna.org/uploads/2015/14000570/Lung Cancer Screening_speaker notes.docx

RC429

Hepatocellular Carcinoma in the Cirrhotic Liver and LI-RADS (An Interactive Session)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S402AB

GI MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC429A LI-RADS Overview, Current Status, and Future Directions

Participants
Cynthia S. Santillan, MD, San Diego, CA, (csantillan@mail.ucsd.edu) (*Presenter*) Consultant, Robarts Clinical Trials Research Group

LEARNING OBJECTIVES

1) To teach participants how to apply the Liver Imaging Reporting and Data System (LI-RADS) to their interpretation of imaging studies for the evaluation of hepatocellular carcinoma in at-risk patients. 2) To inform radiologists about the various online resources available via the ACR LI-RADS website, including an atlas, lexicon, reporting templates, and flashcards. 3) To update radiologists about future content in LI-RADS, including ultrasound and treatment response assessment guidelines.

ABSTRACT

RC429B LI-RADS Imaging Features: What´s the Evidence?

Participants
An Tang, MD, Montreal, QC (*Presenter*) Speaker, Boehringer Ingelheim GmbH; Speaker, Siemens AG, ; Advisory Board, Imagia

LEARNING OBJECTIVES

1) To review the major and ancillary CT and MRI features used in LI-RADS categorization for assessment of hepatocellular carcinoma (HCC). 2) To highlight the scientific literature supporting the major imaging features and criteria. 3) To summarize the evidence supporting ancillary features.

ABSTRACT

The Liver Imaging Reporting and Data System (LI-RADS) relies on major and ancillary CT and MRI features to categorize observations for assessment of hepatocellular carcinoma (HCC). The major features include arterial phase enhancement, diameter, "washout" appearance, "capsule" appearance and threshold growth. In this course, we will discuss the scientific literature supporting the major imaging features. This will include estimates of diagnostic performance, and intra- and inter-reader agreement. LI-RADS also includes ancillary imaging features that modify the likelihood of HCC. We will provide a brief overview of the evidence supporting these ancillary features.

RC429C LI-RADS and Hepatobiliary Agents

Participants
Kathryn J. Fowler, MD, Chesterfield, MO (*Presenter*) Research support, Bracco Group

LEARNING OBJECTIVES

1) To provide an overview of LI-RADS content that refers to hepatobiliary contrast agents. 2) To review the ancillary features that are described with hepatobiliary contrast agents. 3) To present case examples to illustrate the role of hepatobiliary contrast agents in the diagnosis of hepatocellular carcinoma.

ABSTRACT

Hepatobiliary contrast agents are routinely used in practice for diagnosing and staging HCC. Despite the potential diagnostic benefits, the role of hepatobiliary phase imaging has not been well defined in diagnostic algorithms. LI-RADS provides information on the use of these agents, their role in diagnosis, and potential pitfalls. The aim of this presentation is to provide an overview of hepatobiliary content included in the current version of LI-RADS.

RC429D LI-RADS LR-5 versus LR-M

Participants
Thomas A. Hope, MD, San Francisco, CA, (thomas.hope@ucsf.edu) (*Presenter*) Advisory Committee, Guerbet SA; Research Grant, General Electric Company

LEARNING OBJECTIVES

1) Understand the LR-M categorization and its role in LI-RADS. 2) Review imaging features that suggest LR-M. 3) Apply LI-RADS categorizations in cases of LR-5 and LR-M.

ABSTRACT

In at patients at risk for hepatocellular carcinoma (HCC), the diagnosis of malignancies other than HCC can be difficult. LI-RADS provides a categorization (LR-M), which should be used to indicate lesions that may represent malignancies other than HCC. In this

course, we will review the LI-RADS categorization LR-M and its relationship to LR-5. We will discuss findings that suggest LR-M and provide case examples where the diagnosis of LR-M and LR-5 should be made. We will also discuss how a LR-M categorization may affect clinical decision making.

RC432

Measuring Quality in Radiology

Tuesday, Dec. 1 4:30PM - 6:00PM Location: N230

LM SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC432A Business Intelligence and Analytics in Radiology: Scorecards, Dashboards, Big Data, and Beyond

Participants
Paul J. Chang, MD, Chicago, IL, (pchang@radiology.bsd.uchicago.edu) (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Medical Advisory Board, lifeIMAGE Inc; Medical Advisory Board, Merge Healthcare Incorporated

LEARNING OBJECTIVES

1) The technical steps required to develop and implement dashboards and scorecards (including data/state aggregation, semantic normalization, modeling, data mining, and presentation) will be discussed. 2) Specific strategies and technologies that can be used to create dashboards and scorecards (including HL7, DICOM, ETL, web services, and SOA) will be illustrated. 3) Strategies to create a sustainable and agile architecture to support advanced business intelligence and analytics (BIA) tools will be explored. (This course is part of the Leadership Track)

ABSTRACT

Current and near future requirements and constraints will require radiology practices to continuously improve and demonstrate the value they add to the enterprise. Merely "managing the practice" will not be sufficient; groups will be required to compete in an environment where the goal will be measurable improvements in efficiency, productivity, quality, and safety. Although the phrase "one cannot improve a process unless one can measure it" is a familiar platitude, it is an increasingly important and relevant concept. The proper leveraging of formal Business Intelligence and Analytics (BIA) is a critical, absolutely essential strategy for any radiology group. Although currently underutilized, concepts such as Key Performance Indicators (KPIs), tactical dashboards, and strategic scorecards, should be familiar tools for radiology groups attempting to "navigate disruption."

RC432B Quality: Going Beyond the Metrics

Participants
Jonathan W. Berlin, MD, Evanston, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define population health and articulate the essential role of quality in this new health care paradigm. 2) Consider the key role of patient experience in the concept of radiology quality. 3) Explore the concepts of quality and value in radiology. (This course is part of the Leadership Track)

ABSTRACT

Quality has become an essential component of radiology practices. But what is quality and how is it measured? The course will attempt to answer these questions from three perspectives. First, the perspective of quantitative radiology quality metrics and ways of measuring them will be explored, and methods of data analytics will be considered. Second, the concept of quality as it applies to a new heath care delivery paradigm of population health will be analyzed. Population health is a framework in which health care entities and providers are tasked with keeping an entire defined population healthy, rather than the current healthcare delivery system that focuses largely on individual sick patients. The third speaker will address the essential role of patient satisfaction and positive patient experience in the concept of quality in radiology. These areas are increasingly prevalent in on line rating sites, a domain that is not typically assessed with current standardized quality metrics.

RC432C Demonstrating Quality to CMS and the Other Payors

Participants
William T. Thorwarth JR, MD, Reston, VA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define population health and articulate the essential role of quality in this new health care paradigm. 2) Consider the key role of patient experience in the concept of radiology quality. 3) Explore the concepts of quality and value in radiology. (This course is part of the Leadership Track)

ABSTRACT

Quality has become an essential component of radiology practices. But what is quality and how is it measured? The course will attempt to answer these questions from three perspectives. First, the perspective of quantitative radiology quality metrics and ways of measuring them will be explored, and methods of data analytics will be considered. Second, the concept of quality as it applies to a new heath care delivery paradigm of population health will be analyzed. Population health is a framework in which health care entities and providers are tasked with keeping an entire defined population healthy, rather than the current healthcare delivery system that focuses largely on individual sick patients. The third speaker will address the essential role of patient satisfaction and positive patient experience in the concept of quality in radiology. These areas are increasingly prevalent in on line rating sites, a domain that is not typically assessed with current standardized quality metrics.

RC450

Targeted Treatment and Imaging of Liver Cancers: Basic to Advanced Techniques in Minimally-Invasive Therapies and Imaging

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S403A

GI OI IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
John J. Park, MD, PhD, Duarte, CA (*Moderator*) Proctor, Sirtex Medical Ltd; Advisory Board, Guerbet SA
Jinha Park, MD, PhD, Duarte, CA (*Moderator*) Speakers Bureau, Bayer AG; Advisory Board, Guerbet SA
John J. Park, MD, PhD, Duarte, CA (*Presenter*) Proctor, Sirtex Medical Ltd; Advisory Board, Guerbet SA
Jinha Park, MD, PhD, Duarte, CA (*Presenter*) Speakers Bureau, Bayer AG; Advisory Board, Guerbet SA
Andrew C. Price, MD, Scottsdale, AZ (*Presenter*) Nothing to Disclose
Steven S. Raman, MD, Santa Monica, CA (*Presenter*) Nothing to Disclose
Marcelo Guimaraes, Charleston, SC (*Presenter*) Consultant, Cook Group Incorporated ; Consultant, Baylis Medical Company; Consultant, Terumo Corporation; Patent holder, Cook Group Incorporated

LEARNING OBJECTIVES

1) Discuss the role of the interventional radiologist in the treatment and management of patients with primary and metastatic liver cancer as part of the multidisciplinary team. 2) Learn best practice techniques in the treatment of liver cancers, with emphasis on both locoregional and focal therapeutic approaches, and indications for treatment. 3) Explore various tips and tricks for each treatment modality and learn how to avoid complications through good patient selection, choosing the appropriate techniques, and knowing what common mistakes to avoid. 4) Learn about newer and developing techniques and devices, their potential roles and indications, and potential pitfalls. 5) Explore advanced imaging modalities in the detection of tumors and for monitoring treatment response.

ABSTRACT

RC451

Abdominal Dual Energy CT in Practice

Tuesday, Dec. 1 4:30PM - 6:00PM Location: E351

GI CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Desiree E. Morgan, MD, Birmingham, AL (*Presenter*) Research support, General Electric Company
Alec J. Megibow, MD, MPH, New York, NY (*Presenter*) Consultant, Bracco Group
Eric P. Tamm, MD, Houston, TX (*Presenter*) Nothing to Disclose
Daniel T. Boll, MD, Durham, NC (*Presenter*) Research Grant, Siemens AG; Research Grant, Koninklijke Philips NV; Research Grant, Bracco Group

LEARNING OBJECTIVES

1) Understand the principles of image acquisition and post processing of dual energy CT technologies currently commercially available in the US. 2) Assess the technological innovations made possible with dual energy CT and the potential advances to enhance clinical practice and problem-solving in abdominal imaging. 3) Contrast the workflow issues and limitations of the various dual energy approaches as applicable to imaging of patients with abdominal disease.

ABSTRACT

After a brief overview of basic physics principles that distinguish the currently available dual energy CT scanner technologies, a variety of topics regarding dual source dual energy CT, single source dual energy CT, and sandwich detector dual energy CT will be covered by three experts using the technology in clinical practice. This will include image aquisition and patient experience, development of specific abdominal imaging protocols, workflow considerations, such as automated generation of blended images, virtual monoenergetic energy images, iodine/water material density images or iodine maps at the scanner level versus radiologist image manipulation, and will focus on real experience approaches to image interpretation. Strengths and limitations of dual source, single source, and sandwich detector dual energy CT will be demonstrated and discussed.

RC452

Nerve Ultrasound Based on a Regional Approach: Elbow to Hand (Hands-on)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: E264

MK NR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Carlo Martinoli, MD, Genova, Italy, (carlo.martinoli@unige.it) (*Moderator*) Nothing to Disclose
J. Antonio Bouffard, MD, Detroit, MI (*Presenter*) Nothing to Disclose
Catherine J. Brandon, MD, Ann Arbor, MI (*Presenter*) Stock options, VuCOMP, Inc
Mary M. Chiavaras, MD, PhD, Ancaster, ON (*Presenter*) Nothing to Disclose
Joseph G. Craig, MD, Detroit, MI (*Presenter*) Nothing to Disclose
Michael A. Dipietro, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
David P. Fessell, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Ghiyath Habra, MD, Royal oak, MI (*Presenter*) Nothing to Disclose
Marnix T. van Holsbeeck, MD, Detroit, MI, (marnix@rad.hfh.edu) (*Presenter*) Consultant, General Electric Company Consultant, Koninklijke Philips NV Stockholder, Koninklijke Philips NV Stockholder, General Electric Company Grant, Siemens AG Grant, General Electric Company
Rachel B. Hulen, MD, Novi, MI (*Presenter*) Nothing to Disclose
Marina Kislyakova, MD, Moscow, Russia, (mkisliakova@yandex.ru) (*Presenter*) Nothing to Disclose
Joseph H. Introcaso, MD, Neenah, WI (*Presenter*) Nothing to Disclose
Jon A. Jacobson, MD, Ann Arbor, MI (*Presenter*) Consultant, BioClinica, Inc; Royalties, Reed Elsevier; ; ;
Kenneth S. Lee, MD, Madison, WI (*Presenter*) Research Consultant, SuperSonic Imagine; Consultant, Echometrix, LLC; Royalties, Reed Elsevier
Humberto G. Rosas, MD, Madison, WI (*Presenter*) Nothing to Disclose
Matthieu Rutten, MD, Hertogenbosch, Netherlands (*Presenter*) Nothing to Disclose
Courtney E. Scher, DO, Detroit, MI (*Presenter*) Nothing to Disclose
Alberto S. Tagliafico, MD, Genova, Italy (*Presenter*) Nothing to Disclose
Ximena L. Wortsman, MD, Santiago, Chile, (xworts@yahoo.com) (*Presenter*) Nothing to Disclose
Andrea Klauser, MD, Innsbruck, Austria (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Familiarize course participants with the ultrasound appearance of nerves and the scanning techniques used to image them in the distal upper extremity. 2) Emphasize the ultrasound anatomy of the median, ulnar, radial nerves and their divisional branches at the most common sites of entrapments, including the carpal tunnel and the cubital tunnel. 3) Learn the technique to image some minor nerves in their course throughout the distal upper extremity, such as the the lateral and the medial antebrachial cutaneous. 4) Outline the range of clinical conditions where ultrasound is appropriate as the primary imaging modality for nerve assessment.

ABSTRACT

In recent years, ultrasound of the musculoskeletal and peripheral nervous systems is becoming an increasingly imaging tool with an expanding evidence base to support its use. However, the operator dependent nature and level of technical expertise required to perform an adequate ultrasound assessment means that appropriate training is required. For this purpose, the present course will demonstrate the basic principles of musculoskeletal ultrasound with a special focus on nerves of the distal upper extremity (elbow to hand). The standardized techniques of performing an adequate ultrasound study of the median, ulnar, radial and their divisional branches, lateral cutaneous of the forearm and medial cutaneous of the arm and the forearm will be illustrated. The hands-on workshops will provide the opportunity to interactively discuss the role of ultrasound in this field with expert instructors. Participants will be encouraged to directly scan model patients. A careful ultrasound approach with thorough understanding of soft-tissue planes and extensive familiarity with anatomy are prerequisites for obtaining reliable information regarding the affected structure and the site and nature of the disease process affecting it.

Honored Educators

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Jon A. Jacobson, MD - 2012 Honored Educator

RC453

Clinical Decision Support: Impact and Lessons from Large Scale Implementations

Tuesday, Dec. 1 4:30PM - 6:00PM Location: E353A

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Emanuele Neri, MD, Pisa, Italy (*Moderator*) Nothing to Disclose

Sub-Events

RC453A Results and Lesson from the Medicare Imaging Demonstration

Participants
Keith D. Hentel, MD, MS, New York, NY, (keh9003@med.cornell.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the lessions learned in the Weill Cornell Implementation of CDS for the MID. 2) Apply lessons learned in the MID to guide future CDS implementations.

RC453B Mass General Hospital

Participants
Jeffrey B. Weilburg, MD, Boston, MA (*Presenter*) Nothing to Disclose

RC453C Virginia Mason

Participants
C. Craig Blackmore, MD,MPH, Seattle, WA, (craig.blackmore@vmmc.org) (*Presenter*) Royalties, Springer Science+Business Media Deutschland GmbH

LEARNING OBJECTIVES

1) To understand the implementation of clinical decision support at Virginia Mason. 2) To apply lessons learned from successful implementation of clinical decision support. 3) To analyze factors contributing to the success or failure of clinical decision support in decreasing inappropriate imaging.

ABSTRACT

At Virginia Mason, we published one of the earliest clinical decision support programs for advanced imaging. That program differed in many important ways from other programs, including the Medical Imaging Demonstration project, by deploying a targeted intervention directed at a limited number of high cost/high utilization studies. Our clinical decision support system achieved 25% decreases in imaging across the included studies through use of a "hard stop" barrier whereby inappropriate imaging was not permitted to proceed.

RC453D Brigham and Women's Hospital

Participants
Ramin Khorasani, MD, Roxbury Crossing, MA (*Presenter*) Consultant, Medicalis Corp

ABSTRACT

Clinical Decision Support (CDS) has been recognized as an important tool in helping reduce inappropriate use of medical imaging to improve the quality of care and reduce waste by providing evidence-based recommendation to ordering providers at the time of order entry. Three federal regulations aimed to assess the impact of imaging CDS on use of high cost imaging, and promote and accelerate its use. 1. (Medicare Improvements for Patients and Providers Act or MIPPA) required CMS to perform a large scale demonstration project (Medicare Imaging Demonstration or MID; 2011-2014) to assess the impact of imaging CDS based on pre-determined professional society guidelines on utilization of ambulatory targeted high cost imaging procedures for medicare fee for service patients. 2. Stage two of Meaningful Use of health IT federal regulations provide modest financial incentives for adoption of CDS, including for imaging, and 3. Promoting Evidence-Based care section of the Protecting Access to Medicare Act (PAMA) of 2014 mandates use of imaging CDS for specified ambulatory high cost imaging services as a requirement for payment for such services beginning January 2017. Despite these ongoing federal initiatives, adoption of imaging CDS has been limited in part because of ongoing debate on best practices for implementation and use of imaging CDS.In this session, speakers with experience in use of imaging CDS, including large scale implementation, will share their experience on impact of CDS, and lessons learnt from implementation of imaging CDS to help inform best practices for imaging CDS.

RC454

A Practical Approach for Beginning Radio-genomic Research

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S501ABC

BQ IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Maryellen L. Giger, PhD, Chicago, IL (*Presenter*) Stockholder, Hologic, Inc; Shareholder, Quantitative Insights, Inc; Royalties, Hologic, Inc; Royalties, General Electric Company; Royalties, MEDIAN Technologies; Royalties, Riverain Technologies, LLC; Royalties, Mitsubishi Corporation; Royalties, Toshiba Corporation; Researcher, Koninklijke Philips NV; Researcher, U-Systems, Inc
Hui Li, MD, PhD, Chicago, IL (*Presenter*) Nothing to Disclose
Karen Drukker, PhD, Chicago, IL, (kdrukker@uchicago.edu) (*Presenter*) Nothing to Disclose
Elizabeth S. Burnside, MD, MPH, Madison, WI (*Presenter*) Stockholder, NeuWave Medical Inc
Yuan Ji, Chicago, IL (*Presenter*) Nothing to Disclose
Alexandra V. Edwards, Chicago, IL (*Presenter*) Nothing to Disclose
John Papaioannou, MSc, Chicago, IL (*Presenter*) Nothing to Disclose
Chun-Wai Chan, MS, Chicago, IL (*Presenter*) Nothing to Disclose
Yitan Zhu, PhD, Evanston, IL (*Presenter*) Nothing to Disclose
Robert Tomek, MSc, Darien, IL (*Presenter*) Employee, Quantitative Insights, Inc
Michael R. Chinander, Chicago, IL (*Presenter*) Researcher, Quantitative Insights, Inc

LEARNING OBJECTIVES

1) Understand what planning and online resources are needed to create a successful cross-disciplinary radio-genomic research team that can efficiently meet hypothesis-generated imaging/genomic science objectives. 2) Comprehend what skill set distinctions are needed for a hypothesis-resolving radio-genomic research team and how those essential components can be assembled to investigate and/or discover a given disease signature. 3) Learn how to grasp a radio-genomic conceptual research framework that may at first seem unfamiliar to imaging scientists.

ABSTRACT

RCA35

Creating, Storing, and Sharing Teaching Files Using RSNA's MIRC® (Hands-on)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S401AB

ED **IN**

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Krishna Juluru, MD, New York, NY (*Moderator*) Nothing to Disclose
Omer A. Awan, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how easy it is to install the new and improved RSNA teaching file software with the one-click installer. 2) Learn how to create, organize, and share teaching files, create conference documents and save interesting cases for yourself, your group or your department.

RCB35

Radio-Genomic Research: Accessing Clinical Imaging-Genomics-Pathology Data from Public Archives-The Cancer Imaging Archive (Hands-on)

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
C. Carl Jaffe, MD, Boston, MA, (carljaffe@gmail.com) (*Presenter*) Nothing to Disclose
John B. Freymann, BS, Rockville, MD (*Presenter*) Nothing to Disclose
Justin Kirby, Bethesda, MD (*Presenter*) Stockholder, Myriad Genetics, Inc
Fred W. Prior, PhD, Little Rock, AR (*Presenter*) Stockholder, Siemens AG
Lawrence R. Tarbox, PhD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how to propose new data sets for hosting in The Cancer Imaging Archive (TCIA). 2) Identify and download existing TCIA data sets which match your research interests. 3) Collaborate with other researchers using Shared Lists and Digital Object Identifiers. 4) Identify support resources including the TCIA helpdesk, FAQs, and system documentation.

ABSTRACT

Access to large-scale genomic-clinical-pathology databases are essential for researchers to understand disease and devise precision medicine pathways, especially in cancer. But HIPAA compliant collections of network downloadable diagnostic clinical images, publically accessible that link to comprehensive molecular physiologic and clinical data has been limited till now. This hands-on session will teach the basic skills needed to navigate the "Big Data" Cancer Imaging Archive open-access database of diagnostic radiology and pathology images that are cross-linked to clinical disease cases analyzed and archived in the NIH Cancer Genome Atlas. With this knowledge radiologists and imaging scientists can undertake cutting-edge research capable of linking clinical imaging to discover new genomic-based disease signatures.

URL

RCC35

Standardized Terminology in Radiology: Applications and New Developments using RadLex and Playbook

Tuesday, Dec. 1 4:30PM - 6:00PM Location: S102D

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Kenneth C. Wang, MD, PhD, Ellicott City, MD, (kcwang@gmail.com) (*Moderator*) Co-founder, DexNote, LLC;

LEARNING OBJECTIVES

1) To recognize the need for standardized terminology for radiology imaging examinations. 2) To describe the RadLex Playbook, which provides standard names and codes for radiology orderables. 3) To demonstrate the value of RadLex Playbook for improving radiology practice.

Sub-Events

RCC35A Terminology Standardization in CT: Progress and Challenges

Participants
Laurel Burk, Springfield, VA, (laurel.burk@fda.hhs.gov) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify challenges associated with non-standard CT terminologies. 2) Compare currently available standard CT lexicons. 3) Explain the role of consensus standards in FDA's regulation of radiological devices.

ABSTRACT

The inconsistency in names used for CT acquisition and reconstruction parameters across different scanner models can be confusing to operators, possibly leading to unnecessary radiation exposure or poor image quality. The AAPM Working Group on Standardization of CT Nomenclature and Protocols (WGCTNP) is working toward a set of consensus recommended CT parameter terms and definitions. Ongoing work includes: identifying relevant terms from existing standard lexicons; mapping generic terms to vendor-specific terminology (lexicon published on the AAPM 'CT Scan Protocols' website); and identifying preferred names based on use in the literature and clinical practice.

RCC35B RadLex® Playbook: Standardized Terminology for Naming and Coding Imaging Procedures

Participants
Kenneth C. Wang, MD, PhD, Ellicott City, MD, (kcwang@gmail.com) (*Presenter*) Co-founder, DexNote, LLC;

LEARNING OBJECTIVES

1) To illustrate the motivations for RadLex Playbook. 2) To describe the Playbook semantic model. 3) To review Playbook implementation strategies. 4) To introduce the Playbook / LOINC harmonization project.

ABSTRACT

The historical lack of a standard naming scheme for imaging studies has limited exam interoperability. The RadLex Playbook provides a system for creating standard radiology procedure names and codes, enabling a variety of applications in dose tracking and optimization, enterprise integration, and quality improvement. This presentation will illustrate the motivations for Playbook adoption, and describe the semantic model used to create Playbook codes. We will also review strategies and technical considerations in Playbook implementation. Finally, we will describe work to harmonize Playbook with the LOINC system of codes.

RCC35C Standard Terminology for Radiology Reporting

Participants
Charles E. Kahn JR, MD, MS, Philadelphia, PA, (charles.kahn@uphs.upenn.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define the roles of standardized vocabularies in radiology reporting. 2) Describe how terms from standardized vocabularies are being incorporated to RSNA's radiology reporting templates. 3) Understand how standardized vocabularies allow reporting templates and radiology reports to be interoperable across a variety of languages, information systems, and applications.

ABSTRACT

Standardized terminologies can help radiologists communicate the results of imaging procedures more effectively. A well-defined terminology can eliminate ambiguity, and can guide radiologists to use appropriate descriptive terms. Standardized vocabularies can overcome language barriers and the limitations of proprietary systems. This presentation will explore the roles of standardized terminologies in the reporting templates being developed by the RSNA Reporting Initiative. Structured reporting gives radiologists the opportunity to incorporate controlled vocabularies, such as RadLex®, into their reports to enhance the reports' clinical usefulness, facilitate data extraction, and improve quality.

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Charles E. Kahn JR, MD, MS - 2012 Honored Educator

MSRO39

BOOST: CNS-eContouring

Tuesday, Dec. 1 4:45PM - 6:00PM Location: S104B

NR RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Jonathan P. Knisely, MD, Lake Success, NY (*Presenter*) Travel support, Elekta AB; Travel support, BrainLAB AG; Speaker, BrainLAB AG; Travel support, Cyber Medical Corporation Limited
Jesty R. Abraham, DO, Philadelphia , PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define normal anatomy in the CNS. 2) Define and contour the GTV/CTV for Glioma. 3) Define and contour the GTV/CTV for CNS tumors.

ABSTRACT

The safe and successful treatment of brain tumors is depending upon accurately and reliablity being able to identify normal CNS anatomy, and regions of gross tumor and regions at risk. This course will teach participants to identify normal anatomy and define the GTV and CTV for brain tumors.

SPSC40

Controversy Session: 'My Back Hurts': Fluoroscopy or CT-guided Intervention?

Wednesday, Dec. 2 7:15AM - 8:15AM Location: E451B

CT IR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants
Walter S. Bartynski, MD, Charleston, SC (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify various etiologies of low back pain and neck pain that may be amenable to image-guided pain injections. 2) Develop a pain management plan utilizing image-guided injections. 3) Assess what imaging findings and clinical symptoms are appropriate for image-guided pain injections. 4) Discuss the advantages and disadvantages of CT versus fluoroscopically guided pain injections.

Sub-Events

SPSC40A For Fluoroscopic Injection Procedures

Participants
Lubdha M. Shah, MD, Salt Lake Cty, UT, (lubdha.shah@hsc.utah.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

URL

SPSC40B CT Injection Procedures

Participants
Peter G. Kranz, MD, Durham, NC, (peter.kranz@duke.edu) (*Presenter*) Research Consultant, Cephalogics, LLC; Research Consultant, Biogen Idec Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

URL

SPSH40

Hot Topic Session: Molecular Imaging and Radionuclide Therapy for Prostate Cancer

Wednesday, Dec. 2 7:15AM - 8:15AM Location: E451A

GU MI OI RO

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants
Uwe Haberkorn, MD, Heidelberg, Germany, (uwe.haberkorn@med.uni-heidelberg.de) (*Moderator*) Nothing to Disclose
Eric M. Rohren, MD, PhD, Houston, TX (*Moderator*) Nothing to Disclose
Alexander Drzezga, MD, Cologne, Germany (*Moderator*) Research Grant, Eli Lilly and Company; Speakers Bureau, Siemens AG; Speakers Bureau, General Electric Company; Speakers Bureau, Piramal Enterprises Limited; Research Consultant, Eli Lilly and Company; Research Consultant, Piramal Enterprises Limited; ; ; ; ; ;

ABSTRACT

Radium-223 is a recently approved therapy for treatment of bone metastases in patients with metastatic prostate carcinoma. As an alpha-emitting radioisotope, radium has the potential to be a powerful therapy for treatment of a variety of skeletal malignancies. In this presentation, the use of radium-223 in the treatment of prostate cancer will be reviewed through a case-based format. Future directions in radium-223 therapy will be discussed.

URL

Sub-Events

SPSH40A Ra-223 Therapy for Skeletal Metastases from Prostate Cancer

Participants
Eric M. Rohren, MD, PhD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the chemical and physical features of radium-223 dichloride. 2) Discuss the clinical utility of radium-223 therapy. 3) Understand the technique for radium-223 administration. 4) Review the anticipated outcomes of radium-223 therapy through case-based review.

ABSTRACT

Radium-223 is a recently approved therapy for treatment of bone metastases in patients with metastatic prostate carcinoma. As an alpha-emitting radioisotope, radium has the potential to be a powerful therapy for treatment of a variety of skeletal malignancies.

URL

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Eric M. Rohren, MD, PhD - 2015 Honored Educator

SPSH40B Comparison of Ga-68 and F-18 Labeled Small Molecule PSMA Tracers for Prostate Cancer Imaging

Participants
Carsten Kobe, Cologne, Germany (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the concept of PSMA PET-imaging in the diagnosis of prostate cancer in general and in comparison to conventional methods. 2) Learn about the currently available alternatives for radiolableling of PSMA-tracers, e.g. 68-Gallium and 18F-Fluoride and their characteristics. 3) Gain insights from first comparative studies about the clinical value of the availble tracers with regard to their sensitivity, specificity and practicability.

SPSH40C PSMA Ligands for Imaging and Therapy of Prostate Cancer

Participants
Uwe Haberkorn, MD, Heidelberg, Germany (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the background and pharmacokinetics of PSMA ligands for PET/CT. 2) Estimate the value of PSMA-based imaging in comparison to choline-based imaging. 3) Assess the value of PSMA-targeting for diagnosis and therapy. 4) Estimate the effects and side effects of endoradiotherapy with PSMA ligands

ABSTRACT

The prostate-specific membrane antigen (PSMA) is frequently over-expressed in prostate cancer (PCa) which led to the

The prostate-specific membrane antigen (PSMA) is frequently over-expressed in prostate cancer (PCa) which led to the development of several PSMA-targeting molecules are for the detection and therapy of metastatic castration resistant prostate cancer (mCRPC).In a first diagnostic study 82.8% of 319 patients investigated with 68Ga-PSMAHBED-PET/CT at least one lesion indicative for PCa was detected. Amongst lesions investigated by histology, 30 were false-negative in 68Ga-PSMAHBED-PET/CT, all other lesions (n=416) were diagnosed true-positive or -negative. Fifty of 116 patients available for follow-up received a local treatment after 68Ga-PSMAHBED-PET/CT. A comparison of the 68Ga-PSMA-ligand with 18F-fluoromethylcholine PET/CT revealed 78 PC-suspicious lesions in 32 patients using 68Ga-PSMA-PET/CT and 56 lesions in 26 patients using Choline-PET/CT (significant with p=0.04). All lesions detected by 18F-fluoromethylcholine-PET/CT were also seen by 68Ga-PSMA-PET/CT. Since the ligand bound to PSMA is internalized, the target may also be used for endoradiotherapy. We used a small molecule inhibitor of PSMA MIP-1095 for therapy in 25 men with final stage mCRPC. PSA values decreased by >50% in 60.7% of the men treated. 84.6 % of men with bone pain showed complete or moderate reduction in pain. Hematological toxicities were mild. 25% of men treated had a transient slight to moderate dry mouth. No adverse effects on renal function were observed.In order to increase the therapeutic flexibilty a theranostic PSMA ligand coupled to DOTA was synthesized which allows coupling to Ga-68 for diagnostic use or to Lu-177 or Ac-225 for therapy. Initial experience in 30 patients shows promising results concerning antitumor activity with mild side effects.

URL

MSRT41

ASRT@RSNA 2015: Face Transplantation and Surgical Planning

Wednesday, Dec. 2 8:00AM - 9:00AM Location: N230

HN

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Research Grant, Toshiba Corporation;

LEARNING OBJECTIVES

1) To describe the principles of face transplantation from a surgical perspective. 2) Protocols for evaluation of bony structures, including 3D printed models. 3) Pre- and post- face transplantation vasucular imaging to define and follow-up the vascular anastomoses. 4) Detail insights of transplantation biology enable by 320-detector row CT.

ABSTRACT

Face transplantation is now accepted as the only option to restore form and function in patients with severe facial deformity. The transplanted tissue comes from an organ donor and is called an "allograft". The allograft tissues can include bone, regions of forehead, eyelid, nose, lips, chin, and cheeks. Surgical planning uses CT, MR, and 3D printed models typically printed from CT images. For all steps, the radiology technologist plays a critical role working in concert with the radiologists and surgeons. Bone is shown in 3d reformatted images and 3D printed models. The vascular anastomosis is the most critical aspect for successful engraftment. CT angiography (CTA) noninvasively images vessels for anastomoses. Patients typically have altered vascular anatomy of the external carotid circulation because of the injury and/or lesions that require face transplantation. Both arterial and venous mapping is required. Post-operatively, both CTA and MRA are used to evaluate patients for surveillance and when potential complications arise. Volumetric rendering of all relevant structures is important in surveillance and can be achieved by 3D printing soft tissue structures. Post-operative CTA has yielded insights to the vascular physiology and pathology of tissue transplantation.

MSCP41

Case-based Review of Pediatric Radiology (An Interactive Session)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S406A

CH GI GU OB PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Sudha A. Anupindi, MD, Philadelphia, PA (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) To apply a systematic approach in the evaluation of pediatric diseases. 2) To identify essential imaging features of various pediatric congenital, musculoskeletal, abdominal and neurological diseases using a multimodality approach. 3) To understand and develop best imaging practice for various pediatric diseases.

ABSTRACT

To apply a systematic approach in the evaluation of pediatric diseases To identify essential imaging features of various pediatric congenital, musculoskeletal, abdominal and neurological diseases using a multimodality approach To understand and develop best imaging practice for various pediatric diseases

Sub-Events

MSCP41A Fetal Thoracic and Abdominal Anomalies

Participants
Christopher I. Cassady, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSCP41B Pediatric Abdominopelvic Tumors

Participants
M. Beth McCarville, MD, Memphis, TN (*Presenter*) Support, General Electric Company

LEARNING OBJECTIVES

View learning objectives under main course title.

MSCP41C Congenital Disorders of the Genitourinary Tract

Participants
Tracy N. Kilborn, MBChB, Cape Town, South Africa (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSES41

Essentials of Genitourinary Imaging

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S100AB

GU MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

MSES41A Catching Ovarian Cancer

Participants
Elizabeth A. Sadowski, MD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the types of ovarian epithelial neoplasm seen on imaging. 2) Assess the risk of ovarian cancer based on imaging appearance of an adnexal lesion and clinical information. 3) Emphasize the role of MRI in further evaluation of adnexal lesions.

ABSTRACT

There is a spectrum of ovarian epithelial neoplasms ranging from benign to malignant. Current theories regarding the precursor lesions are debated; however, the pathway from benign epithelial neoplasm to low grade carcinoma follows an indolent course and is distinctly different from the aggressive evolution of high grade carcinoma. An understanding of the pathogenesis of low grade versus high grade ovarian epithelial neoplasms can be helpful to radiologists, when they are faced with an adnexal lesion. Identifying the imaging features suggestive of benign, intermediate and worrisome lesions can triage adnexal lesions into follow up versus treatment. The purpose of this presentation is to review the imaging features of benign, indeterminate and worrisome adnexal lesions and to discuss the appropriate follow up in each case.

MSES41B US and MRI: Imaging of Chronic Pelvic Pain in Women

Participants
Mostafa Atri, MD, Toronto, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review MRI and US features of adenomyosis and their correlation with pathology. 2) To discuss staging and US and MRI features of endometriosis and their role in the management of this condition. 3) To familiarize imagers with US features of diverticulosis/diverticulitis and how to differentiate it from colitis.

ABSTRACT

Chronic pelvic pain constitutes 10-40% of gynecology visits at a total cost of 39 billion dollars/year in USA. The most common etiologies are gynecological with GI, urology and MSK conditions being the other causes. During this presentation, imaging features of adenomyosis, endometriosis, pelvic congestion, and US features of diverticulosis/diverticulitis are reviewed. Both adenomyosis and endometriosis are common conditions affecting women. They are frequently seen as an incidental finding that can be accurately evaluated by MRI and US in symptomatic patients. There is close correlation between pathology and imaging features of adenomyosis. The main role of imaging in the evaluation of endometriosis is in the staging of the disease to plan for surgery. US features of uncomplicated diverticulitis are discussed. Transvaginal US can accurately diagnose diverticulosis/diverticulitis that should be sought for in women undergoing US to evaluate for chronic pelvic pain.

Handout:Mostafa Atri

http://abstract.rsna.org/uploads/2015/15001868/IMAGING CHRONIC PELVIC PAIN FINAL RSNA 2015 FINAL.pdf

MSES41C Imaging of the Bladder and Ureters

Participants
Manjiri K. Dighe, MD, Seattle, WA (*Presenter*) Research Grant, General Electric Company

LEARNING OBJECTIVES

1) Review embryology and discuss congenital anomalies of the bladder and ureter. 2) Classify and discuss imaging appearance of ureteric and bladder disease. 3) To discuss the protocols and imaging appearance of bladder and ureteric pathology on various modalities. 4) Review the staging of bladder and ureteric malignancies. 5) Discuss the imaging appearance of various stages of bladder and ureteric cancer. 6) Illustrate the newer techniques for imaging of bladder and ureter.

ABSTRACT

The ureter is an extra-peritoneal structure surrounded by fat.; The ureter is divided into three portions: the proximal ureter (upper) is the segment that extends from the ureteropelvic junction to the area where the ureter crosses the sacroiliac joint, the middle ureter courses over the bony pelvis and iliac vessels, and the pelvic or distal ureter (lower) extends from the iliac vessels to the bladder. It is a dynamic organ and not a simple conduit through which urine flows. Benign and malignant lesions can affect the ureter and these maybe due to contiguous involvement from the kidney or bladder. The ureter can be imaged by a variety of modalities including computed tomography (CT), magnetic resonance imaging (MR), direct pyelography (DP) both antegrade (AP) and retrograde (RP), nuclear medicine diuretic scan and voiding cystourethrography (VCUG). Benign lesions like endometriosis,

Ureteritis, Ureteritis cystica can affect the ureter as well. Transitional cell carcinoma in the ureter is usually diagnosed on imaging. Bladder carcinoma is the fourth most common cancer in men and women. Knowledge of imaging options and appearance is necessary for both radiologists and urologists. Transitional cell carcinoma (TCC) is the most common bladder neoplasm with squamous cell and adenocarcinoma found in less than 10% of cases.; Benign lesions are uncommon but some can be suggested by their imaging appearance. Cystoscopy allows tissue diagnosis and treatment of superficial lesions. Although magnetic resonance imaging (MRI) and computed tomography (CT) both have limitations in detailing depth of muscle invasion, both have a prominent role helping to define the lesion and in staging. This presentation illustrates the role of MR and CT in evaluating bladder and ureter with a discussion of the newer techniques of MR Diffusion Weighted Imaging (DWI) and virtual cystoscopy by CT or MR.

MSRO41

BOOST: Genitourinary-Oncology Anatomy (An Interactive Session)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S103CD

GU RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Jelle O. Barentsz, MD, PhD, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose
Albert J. Chang, MD, PhD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Introduce imaging anatomy relevant to prostate cancer and review imaging issues for contouring primary tumors, nodal regions, and adjacent critical structures. 2) Review how the integration of different imaging modalities can affect tumor delineation. 3) How to choose appropriate imaging methods for specific purposes and to discuss the significance of certain imaging findings.

MSSR41

RSNA/ESR Emergency Symposium: CNS Emergencies (An Interactive Session)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S402AB

NR ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Ronald J. Zagoria, MD, San Francisco, CA, (ron.zagoria@ucsf.edu) (*Moderator*) Nothing to Disclose
Andras Palko, MD, PhD, Szeged, Hungary (*Moderator*) Medical Advisory Board, Affidea Group;

Sub-Events

MSSR41A CNS Trauma and Neurovascular Injury

Participants
Howard A. Rowley, MD, Madison, WI, (hrowley@uwhealth.org) (*Presenter*) Research Consultant, Bracco Group; Research Consultant, Guerbet SA; Research Consultant, General Electric Company; Consultant, F. Hoffmann-La Roche Ltd; Consultant, W.L. Gore & Associates, Inc; Consultant, Lundbeck Group; ; ; ; ; ;

LEARNING OBJECTIVES

1) To be familiar with traumatic brain injury demographics and classification schemes. 2) Be able to apply appropriateness criteria for head trauma imaging in children and adults. 3) Identify key imaging patterns and pitfalls in the evaluation of brain and neurovascular trauma.

ABSTRACT

This lecture on CNS Trauma and Neurovascular Injury is divided into 4 parts: Part 1 will briefly review traumatic brain injury (TBI) demographics and the most common TBI classification schemes; Part 2 will discuss the current imaging approach to acute TBI in clinical practice. Part 3 will illustrate the imaging manifestations of the different injuries located in the extra-axial space (e.g., scalp and skull injury; epidural, subdural, subarachnoid and intraventricular collections), and the intra-axial space (e.g., dysautoregulation, contusion, hematoma, penetrating TBI, axonal injury, fat emboli). Part 4 will review traumatic neurovascular injuries and fracture patterns correlated with high risk of vascular injury.

MSSR41B CNS Non-Traumatic Emergencies

Participants
Marion Smits, MD, PhD, Rotterdam, Netherlands, (marion.smits@erasmusmc.nl) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To know the modalities (CT/MRI) and protocols for non-traumatic neurological emergencies. 2) To know and diagnose the main non-traumatic neurological vascular and non-vascular emergencies. 3) To be aware of the pitfalls and limitations of clinical presentation and imaging findings in non-traumatic neurological emergencies.

ABSTRACT

Neurological emergencies are often associated with high morbidity and mortality, and thus require prompt diagnostic and therapeutic action. Non-traumatic emergencies may however have a subacute onset, and radiological signs may be subtle, which can lead to delay in diagnosis and treatment. Since clinical features are often nonspecific, the radiologist may be the first to point the clinician in the direction of the correct diagnosis. It is therefore of great importance that the radiologist is aware of and familiar with the various imaging findings, on both computed tomography (CT) and magnetic resonance imaging (MRI), of non-traumatic neurological emergencies. These include vascular, infectious and inflammatory diseases. Commonly encountered emergencies are ischaemic and haemorrhage stroke, venous thrombosis, arterial dissection, abscess, acute disseminated encephalomyelitis (ADEM), and encephalitis. Radiological findings in rarer diseases may mimic those in the more commonly occurring diseases, but need to be correctly interpreted as therapeutic strategies and prognosis may be entirely different. Such entities include for instance posterior reversible encephalopathy syndrome (PRES), reversible cerebral vasoconstriction syndrome, Susac's syndrome, and status epilepticus. Furthermore, initial findings of (impending) complications of brain disease, such as hydrocephalus and herniation of brain structures, may be subtle, while early recognition allows for prompt and adequate intervention. Finally, diagnostic and therapeutic interventions performed in an emergency setting may interfere with the diagnosis and interpretation of clinical and imaging findings. Associated limitations and pitfalls therefore need to be recognised to avoid false negative or false positive diagnosis respectively.

MSSR41C Interactive Case Discussion

Participants
Howard A. Rowley, MD, Madison, WI (*Presenter*) Research Consultant, Bracco Group; Research Consultant, Guerbet SA; Research Consultant, General Electric Company; Consultant, F. Hoffmann-La Roche Ltd; Consultant, W.L. Gore & Associates, Inc; Consultant, Lundbeck Group; ; ; ; ; ;
Marion Smits, MD, PhD, Rotterdam, Netherlands, (marion.smits@erasmusmc.nl) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review traumatic brain injury (TBI) and non-traumatic neurological emergencies. 2) To describe imaging manifestations of TBI and non-traumatic neurological emergencies. 3) To understand the clinical implications of radiological imaging findings in TBI and

non-traumatic neurological emergencies. 4) To know the state-of-the-art radiological imaging options for the assessment of acute TBI and non-traumatic neurological emergencies.

ABSTRACT

This interactive case discussion builds on the two previous lectures in this session, on traumatic and non-traumatic neurological emergencies respectively. Both lecturers will take the audience through several clinical cases, highlighting and emphasizing important issues from their lectures, such that the previously presented theory is placed in a clinical context. Preferably, the participants will have attended the two prior lectures, to optimally benefit from and participate in this interactive case discussion.

RC501

High Resolution CT of Diffuse Lung Disease: Read Cases with the Experts (An Interactive Session)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: N228

CH CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Georgeann McGuinness, MD, New York, NY (*Moderator*) Nothing to Disclose
Brett M. Elicker, MD, San Francisco, CA, (brett.elicker@ucsf.edu) (*Presenter*) Nothing to Disclose
Daria Manos, MD, FRCPC, Halifax, NS, (daria.manos@nshealth.ca) (*Presenter*) Nothing to Disclose
Sharyn L. MacDonald, MBChB, Christchurch, New Zealand (*Presenter*) Nothing to Disclose
Georgeann McGuinness, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1)Understand the applications and limitations of HRCT in detecting and characterizing diffuse lung disease through the discussion of expert analysis of unknown cases. 2) Apply correct usage of the HRCT lexicon to specific findings, to better elucidate pathophysiology and to refine differential considerations, by observing experts in HRCT approach unknown cases. 3) Develop diagnosis and management algorithms by working through problematic cases with the expert discussants. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

ABSTRACT

RC502

What´s New from the American Board of Radiology

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S104A

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Milton J. Guiberteau, MD, Houston, TX (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe ABR MOC requirements. 2) Describe methods to implement MOC into one's practice. 3) Assess the implications of "Board Eligible" status. 4) Assess the logistics and results of ABR certifying examinations. 5) Analyze the logistics of the new IR/DR pathway.

Sub-Events

RC502A Making MOC Work

Participants
Milton J. Guiberteau, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC502B The Board Eligible Radiologist: Hiring Perspectives and Concerns

Participants
Valerie P. Jackson, MD, Tucson, AZ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Valerie P. Jackson, MD - 2014 Honored Educator

RC502C ABR Certifying Exams in Diagnostic Radiology

Participants
Dennis M. Balfe, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC502D The Alphabet Soup of MOC, CC, and SA-CME

Participants
Vincent P. Mathews, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC502E IR/DR Certificate and the IR Residency

Participants
Matthew A. Mauro, MD, Chapel Hill, NC (*Presenter*) Data Safety Monitoring Board, BTG International Ltd; Data Safety Monitoring Board, B. Braun Melsungen AG

LEARNING OBJECTIVES

View learning objectives under main course title.

RC503

Adult Structural and Congenital Heart Disease (An Interactive Session)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S103AB

CA CT MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

ABSTRACT

Sub-Events

RC503A Systematic Approach to CT Interpretation in Congenital Heart Disease

Participants
Suhny Abbara, MD, Dallas, TX (*Presenter*) Author, Reed Elsevier; Editor, Reed Elsevier; Institutional research agreement, Koninklijke Philips NV; Institutional research agreement, Siemens AG

LEARNING OBJECTIVES

1) To understand the systematic segmental approach to congenital heart disease. 2) To recognize the CT specific imaging findings that relate to each step in the segmental approach to congenital heart disease.

ABSTRACT

Honored Educators

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Suhny Abbara, MD - 2014 Honored Educator

RC503B Tailoring CT Scan Acquisitions to Specific Indications

Participants
Brian B. Ghoshhajra, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the different indications for cardiac CT, including calcium scoring, coronary CT angiography, electrophysiology procedural planning, structural heart disease interventions (including TAVR), congenital heart disease, myocardial evaluation, and mass workup. 2) To review the differences between various available equipment, and how available equipment might affect a given protocol. 3) To review basic protocols for each of the above exam types, and review specific features of each exam type. 4) To review the advantages and disadvantages of individualized settings within each of the above protocols.

Active Handout:Brian Burns Ghoshhajra

http://abstract.rsna.org/uploads/2015/14000914/RC503B Tailoring CT Scan Acquisitions to Specific Indications - Ghoshhajra Handout.pdf

RC503C Imaging of Cardiac Shunts

Participants
Harold I. Litt, MD, PhD, Philadelphia, PA (*Presenter*) Research Grant, Siemens AG ; Research Grant, Heartflow, Inc;

LEARNING OBJECTIVES

1) Describe MR imaging methods for detection and quantification of intra and extracardiac shunts. 2) Describe CT imaging methods for detection and quantification of intra and extracardiac shunts. 3) Plan an optimized protocol for CT or MR imaging of shunts.

RC503D Role of MRI in Adult CHD Management

Participants
Mini V. Pakkal, MBBS, FRCR, Toronto, ON, (mini.pakkal@uhn.ca) (*Presenter*) Nothing to Disclose

Active Handout:Mini Vithal Pakkal

http://abstract.rsna.org/uploads/2015/14000924/RC503D RSNA final2015.pdf

RC504

Musculoskeletal Series: Current Trends in Musculoskeletal Imaging

Wednesday, Dec. 2 8:30AM - 12:00PM Location: E451B

MK MR

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
Mark D. Murphey, MD, Reston, VA, (MMurphey@acr.org) (*Moderator*) Nothing to Disclose
Christine B. Chung, MD, San Diego, CA (*Moderator*) Nothing to Disclose

Sub-Events

RC504-01 Imaging Diagnosis of Atypical Infection

Wednesday, Dec. 2 8:30AM - 8:55AM Location: E451B

Participants
Mark D. Murphey, MD, Reston, VA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the typical imaging features suggesting atypical musculoskeletal infection. 2) Understand the pathological basis for the imaging patterns of atypical musculoskeletal infection. 3) Detect imaging features that allow differentiation of atypical musculoskeletal infection from neoplastic lesions and virulent infection.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Mark D. Murphey, MD - 2015 Honored Educator

RC504-02 MRI of Total Knee Arthroplasty: Synovial Patterns Predictive of Disease

Wednesday, Dec. 2 8:55AM - 9:05AM Location: E451B

Participants
Angela E. Li, MBBS, MMed, New York, NY (*Presenter*) Nothing to Disclose
Darryl B. Sneag, MD, Chestnut Hill, MA (*Abstract Co-Author*) Nothing to Disclose
Harry G. Greditzer IV, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Christine C. Johnson, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Kara Fields, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Douglas E. Padgett, MD, New York, NY (*Abstract Co-Author*) Consultant, Stryker Corporation;
Theodore T. Miller, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Hollis G. Potter, MD, New York, NY (*Abstract Co-Author*) Research support, General Electric Company

PURPOSE

To determine the sensitivity and specificity of various synovial appearances on MRI in patients with a painful total knee arthroplasty (TKA).

METHOD AND MATERIALS

With IRB approval, 101 consecutive patients who had knee MRI within 1 year prior to revision TKA were identified from our hospital registry of retrieved TKA implants. All MR scans were performed on a 1.5T magnet. Axial, coronal and sagittal PD, sagittal inversion recovery and MAVRIC PD MR images were retrospectively reviewed blinded to the ultimate diagnoses and the cases were categorized by the appearance of the synovium as one of the following: bulky hypertrophied synovium (suggestive of particle induced synovitis), lamellated and hyperintense (suggestive of infection), globally thickened and contracted (suggestive of arthrofibrosis), and mildly thickened with a homogenous effusion (suggestive of non-specific synovitis). The MR appearances were then compared with operative reports, microbiology, and pathology reports.

RESULTS

Bulky hypertrophied synovium had 69% sensitivity, 89% specificity and 94% PPV for particle induced synovitis with implant particles seen at histopathology, and 98 % sensitivity, 78% specificity and 75% PPV for an operative diagnosis of aseptic loosening, severe polyethylene wear, or osteolysis. Lamellated synovitis had 85% sensitivity, 99% specificity and 94% PPV for infection. A contracted and globally thickened synovium had 75% sensitivity, 98% specificity and 60% PPV for arthrofibrosis. A mildly thickened synovial appearance had 63% sensitivity, 93% specificity, and 79% PPV for stiffness, instability, and nonspecific pain as the reason for revision TKA.

CONCLUSION

In patients with a painful TKA, MRI appearance of the synovium can be used to differentiate between cases of particle induced wear, infection, arthrofibrosis and non-specific synovitis.

CLINICAL RELEVANCE/APPLICATION

MRI is predictive of various synovial pathologic conditions in TKA and may be valuable in the diagnostic workup of patients with a painful TKA.

RC504-03 The Value of Simultaneous 18F-FDG-PET/MRI for the Detection of Spondylodiscitis: A Feasibility Study

Wednesday, Dec. 2 9:05AM - 9:15AM Location: E451B

Participants
Benjamin Friedrich, Leipzig, Germany (*Abstract Co-Author*) Nothing to Disclose
Jeanette Fahnert, Leipzig, Germany (*Abstract Co-Author*) Nothing to Disclose
Sandra Purz, MD, Leipzig, Germany (*Abstract Co-Author*) Nothing to Disclose
Jens Gulow, Leipzig, Germany (*Abstract Co-Author*) Nothing to Disclose
Thomas K. Kahn, MD, Leipzig, Germany (*Abstract Co-Author*) Nothing to Disclose
Henryk Barthel, Leipzig, Germany (*Abstract Co-Author*) Consultant, Siemens AG Consultant, The Piramal Group Travel support, Siemens AG Travel support, The Piramal Group Speaker, Siemens AG Speaker, The Piramal Group
Osama Sabri, MD, Leipzig, Germany (*Abstract Co-Author*) Research Consultant, The Piramal Group; Research Consultant, Siemens AG;
Patrick Stumpp, MD, Leipzig, Germany (*Presenter*) Nothing to Disclose

PURPOSE

The diagnosis of infectious spondylodiscitis is often challenging. Alterations seen in MRI are quite sensitive, but lack specificity and the distinction from osteochondrosis is often difficult. The aim of the present study was to assess the diagnostic value of simultaneous 18F-FDG-PET/MRI in cases of suspected spondylodiscitis.

METHOD AND MATERIALS

In a prospective study 25 patients with suspected spondylodiscitis were enrolled. All patients underwent a simultaneous whole spine simultaneous 18F-FDG-PET/MRI scan including standard MRI sequences with-/-out contrast. Image datasets were evaluated by two radiological residents with 1-5 years experience and one board certified nuclear medicine physician independently and finally in consensus. For all suspected spinal discs as well as a healthy disc SUVmean and SUVmax were determined. The diagnostic certainty of MRI data was evaluated on a five-point Likert Scale. The consensus decision was dichotomized into spondylodiscitis - no spondylodiscitis.

RESULTS

The inter-rater agreement between the two radiologists in regard of the MRI scans was moderate with a weighted κ=0.67 and an absolute diagnostic certainty in just 10%. With addition of the PET data, the agreement between the radiologists rose to κ=0.95 and an absolute diagnostic certainty in 50%. In one case the diagnosis changed due to the additional PET data. The final histological analysis was in all cases identical with the imaging diagnosis. There was a strong correlation between the SUVmax ratio of healthy/sick disc and the 5-point MRI rating with a R2=0.52; $p<0.001$. In a ROC analysis a SUVmax ratio of 2.89 had a 100% specificity and sensitivity with an AUC of 1 for the correct diagnosis. Neither level of CRP nor leukocyte count could show a significant correlation to the spondylodiscitis diagnosis.

CONCLUSION

Simultaneous 18F-FDG-PET/MRI for the detection of Spondylodiscitis seems to be feasable and is increasing the diagnostic certainty in an often challenging imaging diagnosis.

CLINICAL RELEVANCE/APPLICATION

18F-FDG-PET/MRI can be safely used for the detection of Spondylodiscitis.

RC504-04 Assessing the Effect of Football Play on Knee Articular Cartilage Using Delayed Gadolinium-Enhanced MRI of Cartilage (dGEMRIC)

Wednesday, Dec. 2 9:15AM - 9:25AM Location: E451B

Participants
Wenbo Wei, Columbus, OH (*Presenter*) Nothing to Disclose
Becky Lathrop, Columbus, OH (*Abstract Co-Author*) Nothing to Disclose
Guang Jia, PhD, Baton Rouge, LA (*Abstract Co-Author*) Nothing to Disclose
David Flanigan, MD, Columbus, OH (*Abstract Co-Author*) Consultant, Vericel; Consultant, Smith & Nephew plc
Ajit M. Chaudhari, PhD, Columbus, OH (*Abstract Co-Author*) Nothing to Disclose
Michael V. Knopp, MD, PhD, Columbus, OH (*Abstract Co-Author*) Nothing to Disclose
Alan Rogers, MD, Columbus, OH (*Abstract Co-Author*) Nothing to Disclose
Jason E. Payne, MD, Columbus, OH (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Articular cartilage injuries are very common among NFL players. In retired NFL players, early onset of OA was found to be three times higher than the general population. Delayed gadolinium-enhanced MRI of cartilage (dGEMRIC) has been shown to quantify regional variations of glycosaminoglycan (GAG) concentrations within the cartilage. The goal of this pilot study is to determine the cumulative effects of multiple years of play on cartilage microarchitecture assessed by GAG concentration variation using dGEMRIC.

METHOD AND MATERIALS

The MR images of both of each athlete's knee joints were acquired using an 8-channel knee coil at a 3T system (Achieva, Philips). dGEMRIC was performed at pre- and post-contrast injection periods using a set of five fast field echo pulse sequences with multiple flip angles (4, 8, 12, 16, 20 degrees). Sagittal slices were obtained with the imaging parameters as TR/TE = 6.3/3.2 ms, resolution = 0.37 x 0.37 mm^2, slice thickness = 4 mm, NSA = 2. The contrast agent Magnevist was injected intravenously at a standard dose of 0.2 mmol/kg body weight. To help the contrast efficiently diffuse into the cartilage, subjects were instructed to perform joint movement for 100 minutes. The total procedure time was around 3.5 hours.

RESULTS

Except the MTP of the right knee at the pre-season, subjects with more years of football play retained relatively higher volume of contrast at all cartilage compartments in both pre- and post-season. At the pre-season and post-season, one year collegiate football players presented pre-season with 0.116 mM and initial post session with 0.117 mM average contrast concentration. In players with more years of experience, the measurements were elevated to 0.139 mM and 0.140 mM, respectively, both with a 20% increase. The p-value generated from student t-test did not present any significant difference at the pre-season which is probably due to the limited sample size.

CONCLUSION

In conclusion, playing collegiate football for a longer period of time may lead to microstructural alterations, like GAG concentration changes within the knee cartilage. The decreased GAG concentration may be indicative of a higher risk factor for articular cartilage degradation and potential development of OA.

CLINICAL RELEVANCE/APPLICATION

dGEMRIC can be a quantitative imaging technique to identify micro-architectural changes in cartilage health that are not observed with standard cartilage MR sequences.

RC504-05 Use of Combined Dynamic and Quantitative MRI to Investigate the Influence of Cartilage Contact on Cartilage Morphology, Composition, and Ultra-Structure

Wednesday, Dec. 2 9:25AM - 9:35AM Location: E451B

Participants
Jarred Kaiser, Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Fang Liu, Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Darryl Thelen, Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Richard Kijowski, MD, Madison, WI (*Presenter*) Nothing to Disclose

PURPOSE

To investigate the relationship between cartilage contact and cartilage morphology, composition, and ultra-structure using combined dynamic and quantitative MRI.

METHOD AND MATERIALS

Four young asymptomatic volunteers underwent combined dynamic and static MRI on a 3.0T scanner. Dynamic SPGR images were continuously acquired while the subjects actively flexed and extended their knee at 0.5 Hz for 5 minutes in a custom-made loading device. Static 3D-FSE and mcDESPOT bi-component T2 mapping sequences were also performed. Reconstructed kinematics were used to compute tibia contact maps which were defined as the maximum depth of penetration of the tibia cartilage mesh into the femoral cartilage mesh through the flexion-extension cycle. 3D-FSE was used to create tibia cartilage thickness maps, while mcDESPOT was used to create tibia cartilage single-component T2 relaxation time (T2) maps and cartilage fast relaxing water fraction (FF) maps, the latter of which is thought to represent water bound to proteoglycan. The maps were sub-divided into 10 equal-sized regions of interest (ROI) on the medial and lateral tibia. ROI-based Pearson correlation analysis was performed between cartilage contact and cartilage quantitative MRI parameters.

RESULTS

Cartilage contact was greater on the medial tibia than the lateral tibia for all subjects with larger areas of positive penetration of the tibia cartilage mesh into the femoral cartilage mesh and greater maximum depth of penetration. Higher FF values were also noted in the medial tibia in all subjects, while no visible differences in the cartilage thickness and cartilage T2 maps between the medial and lateral tibia could be identified. The degree of cartilage contact was positively correlated with cartilage thickness ($r=0.341$, $p=0.001$) and cartilage FF ($r=0.417$, $p<0.001$) and negatively correlated with cartilage T2 ($r=-0.211$, $p=0.04$).

CONCLUSION

Cartilage is a tissue well-adapted to withstand higher compressive forces with areas exposed to greater contact being thicker and having lower T2 (likely reflecting a thicker radial zone comprised of perpendicularly oriented collagen fibers) and higher FF (likely reflecting greater proteoglycan content).

CLINICAL RELEVANCE/APPLICATION

Combined dynamic and quantitative MRI may be useful for investigating how biomechanical factors within the knee joint influence normal cartilage physiology and cartilage degeneration in patients with osteoarthritis.

RC504-06 Functional Cartilage Imaging in Clinical Practice

Wednesday, Dec. 2 9:35AM - 10:00AM Location: E451B

Participants
Christine B. Chung, MD, San Diego, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Emphasize the biochemical composition of articular cartilage and its relationship to intrinsic MR property. 2) Describe the normal morphologic and quantitative MR signature of articular cartilage on various pulse sequences. 3) Describe MR and clinical cartilage grading systems. 4) Identify indications and appropriate MR protocols for cartilage evaluation, including primary chondral/ osteochondral evaluation versus cartilage evaluation as a surrogate for meniscal function.

RC504-07 Osteochondral Injuries

Wednesday, Dec. 2 10:10AM - 10:30AM Location: E451B

Participants

Carol L. Andrews, MD, Pittsburgh, PA (*Presenter*) Author, Reed Elsevier; Author, Informa PLC

LEARNING OBJECTIVES

1) Describe the findings of imaging of acute bone injury including radiography and MRI. 2) Recognize the bone and marrow changes see on MRI in osteopenia and hyperemia. 3) Identify the imaging findings of osteonecrosis. 4) Accurately describe the entity typically referred to as "osteochondral lesion".

RC504-08 Grade 1 Cartilage Lesions in the Knee are Precursors of More Severe Cartilage Damage - Data from the Osteoarthritis Initiative

Wednesday, Dec. 2 10:30AM - 10:40AM Location: E451B

Participants
Benedikt J. Schwaiger, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Alexandra S. Gersing, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
John Mbapte Wamba, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Michael C. Nevitt, PhD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Charles E. McCulloch, San Francisco, CA (*Abstract Co-Author*) Instructor, F. Hoffmann-La Roche Ltd Expert Witness, Mallinckrodt plc Consultant, Mallinckrodt plc
Thomas M. Link, MD, PhD, San Francisco, CA (*Abstract Co-Author*) Research funded, General Electric Company; Research funded, InSightec Ltd; Royalties, Springer Science+Business Media Deutschland GmbH; Research Consultant, Pfizer Inc;

PURPOSE

The significance of MR cartilage signal abnormalities with or without cartilage swelling (grade 1 lesions) is not well understood and previous reports in the literature are inconclusive. Purpose of our study was therefore to assess the natural evolution of different types of grade 1 cartilage lesions (G1CL) in subjects without radiographic evidence of knee osteoarthritis (OA) over 48 months in comparison to matched controls without lesions.

METHOD AND MATERIALS

Subjects from the Osteoarthritis Initiative (n=59; age 56.6±8.3; 56% women) with G1CL diagnosed on 3T MRIs of the right knee but without focal defects of cartilage and without radiographic evidence of OA (KL scores 0-1) were frequency matched for age, sex, baseline KL and BMI with 52 controls without any cartilage lesion (age 54.8±6.5; 58% women). Individual G1CL (n=76) on intermediate-weighted fast spine echo sequences were categorized into 4 subgrades: A=hypointense, B=inhomogeneous, C=hyperintense, D=hyperintense with swelling. After 48 months progression of cartilage and subchondral bone marrow changes was assessed. Fisher's exact test was used for group and subgrade comparisons.

RESULTS

At baseline G1CL were detected significantly more frequently in the patellofemoral than in the tibiofemoral joint (48 vs. 28, P=0.022), and subgrades A or B were more frequent than C or D (n=65 vs. 11, P<0.001). Across compartments, G1CL progressed in 48-67% to focal cartilage lesions, while only 2-6% of controls showed incidental focal lesions (patella: 48 vs. 6%, P<0.001; trochlea: 52 vs. 2%, P<0.001; medial femur: 67 vs. 2%, P<0.001; lateral femur: 50 vs. 2%, P=0.011; medial tibia: 50 vs. 2%, P<0.001; lateral tibia: 47 vs. 6%, P<0.001). No significant differences in progression were found between G1CL subgrades (P>0.05). Incidental bone marrow abnormalities were associated with G1CL lesions in the patella (39 vs. 2% in the controls, P<0.001), trochlea (36 vs. 2%, P<0.001) and lateral tibia (47 vs. 2%, P<0.001).

CONCLUSION

G1CL are precursors of more severe structural cartilage abnormalities. Reporting these signal abnormalities is therefore crucial to identify patients at risk for progressive cartilage degeneration and may impact patient management.

CLINICAL RELEVANCE/APPLICATION

Grade 1 cartilage lesions often progress to more severe cartilage degeneration, and diagnosis therefore may have an impact on patient management, including life style changes and cartilage repair.

RC504-09 MR Bone Morphometry Predicts Biomechanical Property

Wednesday, Dec. 2 10:40AM - 10:50AM Location: E451B

Participants
Betty Tran, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Sheronda Statum, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Reni Biswas, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Kyu-Sung Kwack, MD, PhD, Suwon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Robert Healey, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Won C. Bae, PhD, San Diego, CA (*Presenter*) Nothing to Disclose
Christine B. Chung, MD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Subchondral trabecular bone is often involved during knee injury and joint degeneration. MR evaluation of articular cartilage, as well as subchondral bone, would be useful clinically. Purpose of this study was to determine if MR morphometric measures of subchondral trabecular bone correlates with shear biomechanical failure.

METHOD AND MATERIALS

Nine 8.5-mm diameter osteochondral cores were harvested (Fig.A) from tibial plateau of cadaveric donors (age range 60 to 86 years old) and imaged at 3T (Fig.C) using 3D spoiled gradient echo without fat suppression at 200 micron isotropic resolution. Cores were cut axially, while recording force and displacement to determine shear energy (Fig.B). MR data was cropped to 1-mm thickness near each cut location, region of interest was selected to exclude artifacts, and standard bone morphometric analysis was performed (Fig C). Total of 19 cut locations were analyzed.

RESULTS

From MR data, 3D structure of trabeculae could be discerned (Fig.C). Many of morphometric measures, including bone volume fraction, trabecular thickness, and structure model index, correlated significantly with biomechanical shear energy (Fig.D), suggesting that higher density, thicker, and plate-like properties of the trabeculae correlated with higher shear energy needed to cut through the sample.

CONCLUSION

High resolution MRI is a useful modality not only for soft tissue evaluation, but also for quantitative evaluation of trabecular bone, which may serve as a surrogate for bone strength.

CLINICAL RELEVANCE/APPLICATION

This study has implications for evaluation of human bone structure using non-ionizing MRI modality, with applications for conditions such as subchondral bone insufficiency fracture.

RC504-10 The Role of Mechanical Stress on the Vascularization of Subchondral Bone in the Femoral Head: A DCE-MRI Study

Wednesday, Dec. 2 10:50AM - 11:00AM Location: E451B

Participants
Jean-Francois Budzik, MD,PhD, Lille, France (*Presenter*) Nothing to Disclose
Guillaume Lefebvre, MD, Lille, France (*Abstract Co-Author*) Nothing to Disclose
Helene Behal, Lille, France (*Abstract Co-Author*) Nothing to Disclose
Sebastien Verclytte, MD, Marcq en Baroeul, France (*Abstract Co-Author*) Nothing to Disclose
Pierre Hardouin, Boulogne-Sur-Mer, France (*Abstract Co-Author*) Nothing to Disclose
Anne Cotten, MD, Lille, France (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the normal perfusion pattern of subchondral bone in the femoral head with Dynamic Contrast Enhanced (DCE)-MRI and to study the influence of mechanical stress.

METHOD AND MATERIALS

This prospective study was approved by our Institutional Review Board. Informed Consent was obtained. DCE-MRI of the right hip was performed in sixty adults (32 women, 28 men) between April and September 2014. Mean age was 37.5 (±12.5). Regions of interest (ROI) were deposed in the center and in subchondral areas of the femoral head. Semi-quantitative and pharmacokinetic parameters were calculated. Perfusion parameters were compared between ROIs using a linear mixed model. Associations of each perfusion parameter with age, sex, body mass index (BMI) were studied using analysis of covariance models; age and sex were systematically introduced into models.

RESULTS

Semi-quantitative and pharmacokinetic parameters were different between the center of the femoral head and supero-lateral, antero-superior and posterior subchondral zones ($p \leq 0.028$). Parameters in the inferior zone differed from those of the supero-lateral and antero-superior zones ($p \leq 0.029$).BMI was negatively correlated with Time To Peak in all zones ($p \leq 0.041$). BMI was positively correlated with Ktrans and Ve values in all zones except the inferior ($p \leq 0.035$). Ve values were inferior in women in every zone ($p \leq 0.039$).Ktrans and Ve values were negatively correlated with age in posterior and inferior zones ($p \leq 0.039$).

CONCLUSION

This study demonstrates that the perfusion of subchondral bone is not homogeneous within the femoral head. Our results suggest that mechanical stress influences the microvascular properties of subchondral bone marrow.

CLINICAL RELEVANCE/APPLICATION

The proposed role of mechanical stress on the microvascularization of subchondral bone offers new opportunities in osteoarthritis research.

RC504-11 Metatarsophalangeal Joint Instability

Wednesday, Dec. 2 11:00AM - 11:25AM Location: E451B

Participants
Hilary R. Umans, MD, Ardsley, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

Overview of lesser metatarsophalangeal joint (MPJ) plantar plate (PP) and capsular degeneration and tear and discuss how it relates to MPJ instability Lesser MPJ Anatomy Symptoms / Exam MPJ region pain Sub-metatarsal Tenderness, esp plantar lateral base toe proximal phalanx Webspace Toe deformity Deviation, esp tibial +/- splaying 2nd-3rd toes Hyperextension at MPJ Etiology of PP and Capsular ligament degeneration + tear Chronic stress >> common than acute trauma Hyperextension + Axial loading high heels Crowding narrow toebox HAV + 2nd metatarsal (MT) protrusion Synovitis stretches MPJ capsule, leading to laxity and MPJ instability degeneration at the phalangeal insertion of the MPJ PP Traumatic tear less common PP tear pattern esp 2nd toe MPJ esp lateral insertion Frequent assoc'd tear of the lateral capsule Clinical grading MPJ instability Vertical stress test Digital Purchase Paper pull-out test Toe deformity Deviation, splaying, hyperextension Natural history: worsening deformity and dysfunction Imaging MRI Without vs with IV gadolinium Bright T2 signal defect at insertion +/- enhancement Enhancing defect +/- corresponding bright T2 signal defect Normal midline Hi Signal zone up to 2.5 mm Elongation = pathologic US Tear = hypoechoic defect at insertion Normal midline hypoechoic zone = 2.5mm Widens with degeneration + tear MRI vs US MRI Static exam Global Overview Can evaluate the capsule More easily DDx b/t pericapsular reactive soft tissue thickening (fibrosis +/or edema) + web space neuroma US Dynamic exam Assess focal tenderness + MPJ instability Technically challenging / learning curve Image incrementally from medial - lateral insertion DDx pericapsular fibrosis from webspace neuroma US Pitfalls Mostly anisotropy due to non-parallel imaging Can mistake midline hypoechoic zone for tear Limitations Sensitive, Not specific Difficult to differentiate degeneration vs tear MPJ capsule

cannot be evaluated Tx Options Conservative measures Taping Padding Rest NSAIDs Avoid steroid injection near the plantar plate insertion Surgery 2 approved surgical devices / approaches for repair of the PP via a doral incision Mini-Scorpion Device Incorporates Weil osteotomy with Plantar Plate repair Limited favorable outcomes Hat-trick System No osteotomy Unilateral or Bilateral Recently approved

ABSTRACT

Active Handout:Hilary Ruth Umans

http://abstract.rsna.org/uploads/2015/15001725/RC504-11.pdf

RC504-12 Chronic Wrist Symptoms in Correlation with Abnormal Scapholunate Joint Kinematics in Four-Dimensional CT Examinations: Initial Clinical Experience

Wednesday, Dec. 2 11:25AM - 11:35AM Location: E451B

Participants
Nima Hafezi Nejad, MD, MPH, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
John N. Morelli, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Uma Thakur, MD, Watchung, NJ (*Abstract Co-Author*) Nothing to Disclose
Scott D. Lifchez, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Kenneth R. Means JR, MD, Baltimore, MD (*Abstract Co-Author*) Speakers Bureau, Auxilium Pharmaceuticals, Inc Faculty, Integra LifeSciences Holdings Corporation
Jaimie Shores, MD, Baltimore, MD (*Abstract Co-Author*) Consultant, AxoGen, Inc Stockholder, MDConnectME
Shadpour Demehri, MD, Baltimore, MD (*Presenter*) Research support, General Electric Company; Researcher, Carestream Health, Inc; Consultant, Toshiba Corporation

PURPOSE

Using Four Dimensional CT scan (4D-CT) we aimed at showing abnormal kinematics of Scapholunate (SL) interval in symptomatic wrists with inconclusive radiographic findings, compared to 4D-CT examinations of asymptomatic contralateral wrists.

METHOD AND MATERIALS

This is an IRB approved, HIPPA complaint, retrospective study of wrist 4D-CT scans of patients who were referred for further evaluation of chronic wrist pain (> 3 months). In all, 12 symptomatic wrists (11 subjects) with chronic symptoms and inconclusive radiographs and 10 asymptomatic contralateral wrists were scanned using 4D-CT. SL interval was measured during three wrist motions: relaxed to clenched fist, flexion to extension, and radial to ulnar deviation. Change in SL interval measurements after each motion was recorded using double-oblique multiplanar reformation technique.

RESULTS

We extracted the normal limits of SL interval during active motion in symptomatic and asymptomatic wrists. While the SL interval is expected to be smaller than 1 mm in asymptomatic wrists (except for the clenched fist: 0.51 - 1.34 mm), symptomatic wrists present with SL interval of larger than 1 mm. In fact in clenched fists (2.53 ± 1.19 mm), or during extension (2.54 ± 1.48 mm) or ulnar deviation (2.06 ± 1.12 mm), average expected SL interval in symptomatic wrists is more than 2 mms. No change in SL interval measurements was detected during all the three wrist motions in asymptomatic contralateral wrists. In contrast, SL intervals increased while moving from relaxed to clenched (0.70; 0.24 - 1.16 mm; p= 0.01), from flexion to extension (1.04; 0.26 - 1.81 mm; p= 0.01) and from radial to ulnar deviation (0.48; - 0.03 - 1.00 mm; p= 0.06). There was a moderate correlation between SL interval change and presence/absence of symptoms (Spearman Rho: 0.45 - 0.65)

CONCLUSION

Compared to asymptomatic wrists, SL interval measurements significantly increase during active motion in symptomatic wrists with inconclusive plain radiographs using 4D-CT examination.

CLINICAL RELEVANCE/APPLICATION

4D CT of the wrist is suitable and clinically feasible to detect subtle motion abnormality suggestive of SLIL insufficiency in patients with chronic wrist pain.This study shows how SL motion abnormalities is associated with presence of symptoms. Moreover, it reports different SL interval limits that are expected in asymptomatic and symptomatic wrists.

RC504-13 Dynamic Ultrasound of Upper Extremity

Wednesday, Dec. 2 11:35AM - 12:00PM Location: E451B

Participants
Mary M. Chiavaras, MD, PhD, Ancaster, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

To understand indications, learn technique, and review associated anatomy for dynamic ultrasound imaging of the shoulder, elbow, wrist, and hand.

RC505

Neuroradiology Series: Brain Tumors

Wednesday, Dec. 2 8:30AM - 12:00PM Location: E451A

NR BQ MR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.50

Participants
Rivka R. Colen, MD, Houston, TX, (rcolen@mdanderson.org) (*Moderator*) Nothing to Disclose
James G. Smirniotopoulos, MD, Bethesda, MD (*Moderator*) Nothing to Disclose

Sub-Events

RC505-01 Beyond Enhancement and Histology: Molecular Markers for Diagnosis

Wednesday, Dec. 2 8:30AM - 8:55AM Location: E451A

Participants
James G. Smirniotopoulos, MD, Bethesda, MD (*Presenter*) Nothing to Disclose

Active Handout:James G. Smirniotopoulos

http://abstract.rsna.org/uploads/2015/15000013/RC505-01 Smirniotopoulos(1).pdf

RC505-03 Radiogenomics Defines Key Genomic Network Driving GBM Invasion

Wednesday, Dec. 2 9:05AM - 9:15AM Location: E451A

Participants
Rivka R. Colen, MD, Houston, TX (*Presenter*) Nothing to Disclose
Markus Luedi, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Sanjay K. Singh, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Islam S. Hassan, MBBCh, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Joy Gummin, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Erik P. Sulman, MD, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Frederick F. Lang, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Pascal O. Zinn, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Clinical care and outcome in Glioblastoma (GBM) remains challenging due to the tumor's invasive grwoth. To establish personalized treatment options in GBM, discovery of genetic mechanisms essential for the tumor's invasion is needed. We have previously described radiogenomic approaches to diagnose gene networks non invasively by analyzing genomic data from TCGA. The purpose of the current reseach is to identify a genetic network that drives GBM invasion and can be targeted specifically.

METHOD AND MATERIALS

Using Kaplan-Meier statistics, the data of the two independent databases TCGA and REMBRANDT were used to validate the genetic netowork's impact on clinical outcome. The genes' staus was assessed in a panel of human glioma stem cells (GSCs) and conventional proneural, classical and mesenchymal GBM cell lines using RT-PCR. Differentiation potential (Tuj1+ve, S100A+ve, and GFAP+ve), self-renewal (limiting dilution assays), invasion (Boyden chamber) and proliferation (BrdU) were assessed. Gain (lentiviral vectors) and loss (SMARTchoice Inducible shRNA) of function experiments were performed. Orthotopic xenograft models (nude mice) were used to characterize the genes impact in vivo. Potential FDA approved therapeutics were identified using connectivity map.

RESULTS

Texture analysis based on radiogenomics significantly predicted the genes responsible for invasion of GBM in a non-invasive manner. Invasion in both, in vitro and in vivo was significantly decreased upun downregulation of this gene network. Transcriptome micro-array analysis showed that an upregulation of the described genes results in class switching from proneural to mesenchymal sub-types. Cmap derived therapeutics could significantly inhibit the gene network's activitiy and hence invasion.

CONCLUSION

The describend genes could be essential drivers of molecular subtypes and invasion in GBM. The therapeutics defined with cmap offer a targetted therapy to adress these key features of GBM pathogenesis. Noninvasive radiogenomics-based identification of tumor subgroups and potential treatment approaches can significantly contribute to personalized therapy.

CLINICAL RELEVANCE/APPLICATION

The described gene network seems to be key for GBM pathogenesis. Noninvasive, radiogenomics-based subgroup identification and specific novel treatment approaches can significanty contribution to personalized GBM therapy.

RC505-04 Radiogenomic Analysis of TCGA/TCIA Diffuse Lower Grade Gliomas by Molecular Subtype

Wednesday, Dec. 2 9:15AM - 9:25AM Location: E451A

Participants
Chad A. Holder, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Laila M. Poisson, Detroit, MI (*Abstract Co-Author*) Nothing to Disclose
Lee Cooper, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose

Erich Huang, PhD, Bethesda, MD (*Abstract Co-Author*) Nothing to Disclose
James Y. Chen, MD, San Diego, CA (*Abstract Co-Author*) Research Consultant, EBM Technologies, Inc Research Consultant, Banyan Biomarkers, Inc
Scott N. Hwang, MD, PhD, Memphis, TN (*Abstract Co-Author*) Nothing to Disclose
Sugoto Mukherjee, MD, Charlottesville, VA (*Abstract Co-Author*) Nothing to Disclose
Leo J. Wolansky, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Brent D. Griffith, MD, Detroit, MI (*Abstract Co-Author*) Nothing to Disclose
Kristen W. Yeom, MD, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose
Michael Iv, MD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Max Wintermark, MD, Lausanne, Switzerland (*Abstract Co-Author*) Advisory Board, General Electric Company;
Rivka R. Colen, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Rajan Jain, MD, Northville, MI (*Abstract Co-Author*) Nothing to Disclose
Justin Kirby, Bethesda, MD (*Abstract Co-Author*) Stockholder, Myriad Genetics, Inc
John B. Freymann, BS, Rockville, MD (*Abstract Co-Author*) Nothing to Disclose
Daniel L. Rubin, MD, MS, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose
C. Carl Jaffe, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Daniel J. Brat, MD, PhD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Adam E. Flanders, MD, Penn Valley, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate relationships between imaging phenotype and genetic classification of LGGs in the TCGA/TCIA database, we analyzed semi-quantitative MR features and IDH/1p19q classifications.

METHOD AND MATERIALS

Pre-operative MRIs of 72 TCGA/TCIA LGGs were reviewed by 3 neuroradiologists blinded to molecular status, using the VASARI LGG feature-set (standardized set of 26 MRI features). Data were compiled across 3 readers to define a single measure per sample. Clinical and molecular classifications were obtained from the LGG-AWG marker paper (TCGA Research Network.NEJM;2015, in press). Associations with histology, WHO grade and molecular type were assessed by Fisher's exact test (categorical features) and ANOVA/t-test (continuous features).

RESULTS

Of 70 tumors with IDH/1p19q classification, 16 were IDHmut-codel, 34 were IDHmut-non-codel, and 19 were IDHwt. IDHmut-codel tumors were preferentially centered in the frontal lobes (75%, FET p=0.026). IDHmut-non-codel tumors tended to arise in frontal (41%) and temporal lobes (41%), while IDHwt tumors did not show preference. Nonenhancing tumor margins were more well-defined for IDHmut LGGs (56% and 76% were well-defined) than for IDHwt tumors (32%, FET p=0.027). 66% of LGGs had an enhancing region, but this was not associated with molecular class (FET p=0.286), although enhancement was more likely in grade III than grade II (FET, p=0.043). 23% of these grade II/III tumors had MRI evidence of necrosis, with presence equally likely in any of the 3 molecular classes (FET p=0.931); however, 5/16 (31%) of LGGs with necrosis on MRI were grade II. IDHwt tumors tended to be smaller than IDHmut tumors (23.0 cm2 vs 39.7cm2, respectively, for maximal area, t-test p<0.001). Further differences were found in T1/FLAIR ratio (FET p=0.030), T2/FLAIR signal crossing the midline (FET p=0.007), and presence of hemorrhage (FET p=0.009), cysts (FET p=0.006), or satellites (FET p=0.030).

CONCLUSION

Review showed differential MR features between LGG molecular classes. IDHwt LGGs had association with aggressive features (e.g., small dimension with poorly-defined non-contrast-enhanced borders). Lack of association with necrosis or presence of an enhancing region suggests that the IDHwt class is not simply underdiagnosed GBM. An investigation of imaging profiles that align with molecular type or define further subclasses is underway.

CLINICAL RELEVANCE/APPLICATION

Differential MR features exist between LGG molecular classes.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Daniel L. Rubin, MD, MS - 2012 Honored Educator
Daniel L. Rubin, MD, MS - 2013 Honored Educator

RC505-05 The Triple-Negative Low-Grade Glioma: MR Imaging Correlates of Aggressive Molecular Phenotype

Wednesday, Dec. 2 9:25AM - 9:35AM Location: E451A

Participants
Javier Villanueva Meyer, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Byung Se Choi, MD, Seongnam-Si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Matthew Wood, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Tarik Tihan, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Soonmee Cha, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Low-grade gliomas (LGGs) are a heterogeneous group of tumors with distinct clinical behavior and prognosis. One strategy to improve their characterization is with molecular biomarkers: P53, IDH 1/2, and 1p19q. These objective markers correlate with histologic classification and clinical outcomes. Specifically, the absence of IDH1/2 mutation or 1p19q deletion have been identified as indicative of a poor prognosis. The purpose of our study was to determine MR imaging parameters that can discriminate a, recently-described, aggressive subtype of LGG that is characterized by an absence of all three of these genetic alterations.

METHOD AND MATERIALS

A retrospective review of our medical records from 2010 to 2014 yielded 105 cases of pathologically-confirmed LGG that had molecular testing for P53 mutation, IDH1/2 mutation, and 1p/19q deletion. The MR imaging characteristics including tumor location, volume, infiltration pattern, cortical involvement, hemorrhage, contrast-enhancement, and quantitative diffusion and perfusion were assessed. Additionally, clinical data of patient treatment, disease course, and survival was collected.

RESULTS

There were 24 diffuse astrocytomas (23%), 36 oligoastrocytomas (34%) and 45 oligodendrogliomas (43%). P53 mutation was found in 21 (20%), IDH1/2 mutation was found in 70 (67%), and 1p19q deletion was found in 45 (43%). Thirteen cases (12%) did not have any of these genetic alterations. Triple-negative tumors showed a lower incidence of cortical involvement ($p<0.05$) and lower mean and minimum apparent diffusion coefficient (ADC) values (1.25 vs 1.45x10^-3 mm^2/s; 0.89 vs 1.09x10^-3 mm^2/s, $p<0.01$). Multiple logistic regression analysis showed low ADC value as an independent predictor of triple-negative LGG. With a cut-off of 1.0x10^-3 mm^2/s, ADC value provides a 73% sensitivity and a 72% specificity with an odds ratio of 7.0 ($p<0.01$). In cases with available clinical follow-up, triple-negative LGGs were found to have disease progression within 2 years in 50% compared to 16% in the non-triple-negative cohort.

CONCLUSION

Triple-negative LGGs are a clinically and biologically aggressive phenotype that exhibit lower mean ADC values and lack of cortical involvement on MR imaging.

CLINICAL RELEVANCE/APPLICATION

MR imaging features can be used alongside molecular biomarkers to assess the aggressiveness and prognosis of LGGs and subsequently may provide a means of guiding management as patient-tailored therapy.

RC505-06 Do Macrocyclic Gadolinium Based Contrast Agents(GBCA) Deposit Gd in Normal Brain Tissue in Patients Receiving Contrast Enhanced MRI?

Wednesday, Dec. 2 9:35AM - 9:45AM Location: E451A

Participants
Nozomu Murata, MD, PhD, Seattle , WA (*Presenter*) Nothing to Disclose
Luis F Gonzalez-Cuyar, MD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Kiyoko Murata, MD,PhD, Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose
Corinne L. Fligner, MD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Russell Dills, PhD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Daniel S. Hippe, MS, Seattle, WA (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV; Research Grant, General Electric Company
Kenneth R. Maravilla, MD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Based on T1 shortening on noncontrast MR, recent studies have suggested that small amounts of gadolinium(Gd) may accumulate in brain even in patients with normal renal function. Recently McDonald confirmed Gd deposition in postmortem human brain tissue. To date, studies have shown Gd brain deposition only with Group 1 linear agents. The purpose of this study was to determine whether Gd is deposited in brain among patients receiving more stable macrocyclic agents using postmortem tissue analysis with inductively coupled plasma mass spectrometry (ICP-MS).

METHOD AND MATERIALS

This study was approved by the IRB. Brain tissue was collected at autopsy from decedents with available medical records that document past history of MRIs with or without GBCA exposure. Decedents with no prior MRI or only nonGd MRI served as controls. Tissue samples were collected from white matter, putamen, globus pallidus, caudate nucleus, pons and dentate nucleus and analyzed for Gd using ICP-MS. Bone tissue from rib was also analyzed as a reference tissue in each case. Results were correlated with types of agent received, cumulative dose, time since dosing and clinical and laboratory data.

RESULTS

Among 21 cases obtained to date, 15 cases with normal renal function received 1 or more GBCA exposures and 6 cases had no exposure. ICP-MS showed measurable amounts of Gd deposition (range 0.003-3.54ng/mg) in all 15 cases receiving GBCA.A subset of these ,4 cases received only a macrocyclic GBCA(1 Gadavist ; 3 ProHance) with doses ranging from 10 to 126 ml and Gd was also detected in all macrocyclic cases (0.006-0.188 ng/mg). Gd in brain was detected after only a single dose and deposition was present among all brain regions sampled. Gd deposition in rib was also positive in all 15 cases and showed significantly higher levels than brain in each case. By comparison there was no detectable Gd in any control cases.

CONCLUSION

Gd deposition occurs in normal brain tissue in patients with normal renal function with a past history of GBCA exposure even in those receiving only macrocyclic agents. The clinical significance remains undetermined and we are pursuing further investigation.

CLINICAL RELEVANCE/APPLICATION

Gd deposition is present in normal brain tissue after only one dose even with macrocyclis agents. This important observation needs further investigation to determine potential toxic effects.

Handout:Nozomu Murata

http://abstract.rsna.org/uploads/2015/15004555/RSNA2015 RC505-06WF.pptx

RC505-07 Post-therapy Brain Tumors: Imaging Pitfalls and Strategy

Wednesday, Dec. 2 9:45AM - 10:10AM Location: E451A

Participants

Soonmee Cha, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss biologic and pathologic complexity of post-therapy brain tumors. 2) Present latest advances in imaging methods to differentiate recurrent tumor and treatment effect. 3) Review strengths and pitfalls of imaging post-therapy brain tumors. 4) Describe imaging strategy to improve diagnosis and management of patients with treated brain tumor.

RC505-08 Directions, Protons and Flows - Practical Advanced Brain Tumor Imaging

Wednesday, Dec. 2 10:30AM - 10:55AM Location: E451A

Participants
Jeffrey L. Sunshine, MD, PhD, Pepper Pike, OH (*Presenter*) Research support, Siemens AG Travel support, Siemens AG Travel support, Koninklijke Philips NV Travel support, Sectra AB Travel support, Allscripts Healthcare Solutions, Inc

RC505-10 A Multiparametric Voxel-level Model for Prediction of Cellularity in Glioblastoma

Wednesday, Dec. 2 11:05AM - 11:15AM Location: E451A

Participants
Peter Chang, MD, Bronx, NY (*Presenter*) Nothing to Disclose
Daniel S. Chow, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Timothy Ung, New York City, NY (*Abstract Co-Author*) Nothing to Disclose
Jennifer Soun, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Christopher G. Filippi, MD, Grand Isle, VT (*Abstract Co-Author*) Research Consultant, Regeneron Pharmaceuticals,Inc; Research Consultant, Syntactx
Angela Lignelli-Dipple, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Peter Canoll, New York City, NY (*Abstract Co-Author*) Nothing to Disclose
Lawrence H. Schwartz, MD, New York, NY (*Abstract Co-Author*) Committee member, Celgene Corporation; Committee member, Novartis AG; Committee member, ICON plc; Committee member, BioClinica, Inc

PURPOSE

To create a robust multiparametric model for prediction of cellular density in glioblastoma (GBM) using voxel-by-voxel analysis of T1W-postcontrast, FLAIR and ADC intensity values calibrated to biopsy-proven histopathologic data.

METHOD AND MATERIALS

As part of an IRB-approved protocol, MR-localized biopsies of GBM patients were obtained from both contrast-enhancing tumor (CE) and nonenhancing (nCE) peritumoral edema using Brainlab referenced to T1W-postcontrast images. Total cell counts were obtained after HandE slide preparation scanned at 400x magnification. FLAIR and ADC data were interpolated and coregistered to the reference T1W volume using affine transformation and a mutual information cost function.For each biopsy site, corresponding mean intensity was obtained on T1W-postcontrast, FLAIR and ADC sequences. Univariate linear regression was used to determine correlation between cell count and intensity for each MR sequence. Two multivariate linear regression models, one each for CE and nCE regions, were used to combine data from each MR sequence into a robust model for tumor cellularity.

RESULTS

A total of 58 biopsy sites were obtained. Overall, cellularity demonstrated moderate linear correlation with T1W-postcontrast ($r = 0.76$), FLAIR ($r = 0.62$) and ADC ($r = 0.64$, within nCE region only). Multiple linear regression combining all three variables yielded a model highly predictive of cellularity, both within the nCE ($r = 0.93$) and CE ($r = 0.76$) region. Within the nCE region, the model weighted ADC ($p = 0.0072$) and FLAIR ($p = 0.058$) more significantly than T1W ($p = 0.83$), as determined by analysis of variance (ANOVA). Within the CE region, T1W ($p < 0.001$) and FLAIR ($p = 0.12$) were weighted more significantly than ADC ($p = 0.21$).

CONCLUSION

A multiparametric model combining T1W-postcontrast, FLAIR and ADC values strongly predicts cell counts in GBM, notably with correlation >90% in the nCE region. By applying this model at each voxel within the tumor volume, a noninvasive map of cellular density can be generated.

CLINICAL RELEVANCE/APPLICATION

Cellularity maps of the peritumoral region in GBM localize tumor microinvasion and may be used as a tool to guide extended surgical resection or biopsy and to assess infiltrative tumor burden.

RC505-11 Receiver Operating Characteristic (ROC) and Logistic Fit Analysis for Detecting Brain Tumor Based on OEF Measurements Obtain by PET and MR

Wednesday, Dec. 2 11:15AM - 11:25AM Location: E451A

Participants
Parinaz Massoumzadeh, PhD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Jonathan E. McConathy, MD, PhD, Saint Louis, MO (*Abstract Co-Author*) Research Consultant, Eli Lilly and Company; Research Consultant, Blue Earth Diagnostics Ltd; Research Consultant, Siemens AG; Research support, GlaxoSmithKline plc
Andrei Vlassenko, MD, PhD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Yi Su, PhD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Hongyu An, DSc, Chapel Hill, NC (*Abstract Co-Author*) Nothing to Disclose
Charles F. Hildebolt, DDS, PhD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Daniel S. Marcus, PhD, Saint Louis, MO (*Abstract Co-Author*) Owner, Radiologics, Inc
Keith M. Rich, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Tammie S. Benzinger, MD, PhD, Saint Louis, MO (*Abstract Co-Author*) Research Grant, Eli Lilly and Company; Investigator, Eli Lilly and Company; Investigator, F. Hoffmann-La Roche Ltd;

PURPOSE

Receiver operating characteristic (ROC) curve and logistic fit analysis for detecting brain tumors using cerebral oxygen extraction fraction (OEF) measurement obtained by [15]O positron emission tomography (PET) and oxygen sensitive magnetic resonance (MR) imaging.

METHOD AND MATERIALS

30 participants (20 with brain tumors) were recruited. MRI included standard clinical sequences plus OEF-MR1; a two-dimensional multi-echo gradient spin echo sequence. Concurrent with the MR acquisition, subjects with brain tumors underwent PET scanning, which included 2 sets of 3 scans with serial inhalation of air with 40-75 mCi [15]O labeled carbon monoxide , 40-75 mCi [15]O labeled oxygen , and injection of 25-50 mCi [15]O labeled water. MR and PET data were post-processed off line and registered to the anatomic T1 pre-and post-contrast images. Regions of interest were drawn based upon contrast-enhancing tumor areas, contra-lateral normal white matter (NWM), and normal gray matter (NGM) Ratios of OEF (rOEF) were obtained for lesions compared to normal tissue. Statistical analyses,including Bland-Altman plot, ROC, and logistic fit, were performed.

RESULTS

Bivariate analyses results are: between two rOEF-PET measurements of all selected regions R=0.92 and P <0.0001, and tumor type R=0.68 and p<0.0001; and similarly betweenr rOEF-MR and rOEF-PET all selected regions R=0.3 and P <0.0413, and tumor type R=0.39 and p<0.173. Based on Bland-Altman analysis both MR and PET methods of obtaining OEF are in agreement (the measurements lie within range ±1.96xSD). However, the coefficient obtain for rOEF-MR covers much larger range which may not not be clinically acceptable. Area under ROC curve (AUC) has much higher value for PET (0.95) than MR (0.58).

CONCLUSION

Both MR and [15]O PET can measure OEF in brain tumors and in peritumoral edema. Variable OEF measurements for tumor and edema may be implication for tumor grade and prognosis. BOLD MR fails in regions with signal loss on SWI or T2*. Area under ROC Curve (AUC) has much higher value for PET (0.95) than MR (0.58). Based on logistic fit probablity of distingusing tumor with PET is much higher than MR.

CLINICAL RELEVANCE/APPLICATION

Both MR and PET techniques have tremendous potential and may offer new insight into the underlying physiology of brain tumors and their response to therapy without requiring radiation or injected contrast. BOLD MR fails in regions with signal loss on SWI or T2*.

RC505-12 What Does the Black Box Tell us? Risk and Benefit of Ferumoxytol as an MRI Contrast Agent

Wednesday, Dec. 2 11:25AM - 11:35AM Location: E451A

Participants
Csanad G. Varallyay, MD, PhD, Portland, OR (*Presenter*) Nothing to Disclose
Rochelle Fu, Portland, OR (*Abstract Co-Author*) Nothing to Disclose
Joao Prola Netto, MD, Portland, OR (*Abstract Co-Author*) Nothing to Disclose
Edward Neuwelt, MD, Portland, OR (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Ferumoxytol, an ultrasmall iron oxide nanoparticle (USPIO) has been marketed as Feraheme® for iron replacement therapy in patients with chronic kidney disease. Due to its magnetic properties, and long plasma half-life, ferumoxytol uniquely allows MR imaging of the intravascular space early after injection, which is beneficial for high-resolution blood volume mapping of brain lesions. Delayed (24h) ferumoxytol enhancement may help in differential diagnosis. As of March 30, 2015, the FDA added a boxed warning to Feraheme® package insert, which strengthens existing warnings regarding potential fatal and serious hypersensitivity reactions including anaphylaxis, even in patients who received Feraheme® previously. It emphasizes the importance of trained personnel, monitoring at least 30 min post injection to properly treat hypersensitivity reactions.

METHOD AND MATERIALS

Our institution has been actively doing imaging research with ferumoxytol for over 10 years. In this study we evaluated early adverse events (occurring within 1 day), potentially related to ferumoxytol administration hypersensitivity, and qualitatively compared it with published data.

RESULTS

At the time writing this abstract we have analyzed a total of 553 ferumoxytol infusions in 298 patients and have not recorded any severe (grade 3, 4 or 5) hypersensitivity reactions occurring within 1 day. Early grade 1 and 2 reactions, were present, such as nausea/vomiting (5.1%), hypertension (3.3%), pruritus (1.3%). In published data, the frequency of severe hypersensitivity of Feraheme® was equivalent to ionic iodinated contrast media, and about 10x higher than gadolinium MR contrast agents and nonionic iodinated contrast agents.

CONCLUSION

Our results suggest less frequent severe hypersensitivity reactions compared to published data, and it may be due to the difference in patient population. A detailed toxicity evaluation of our data is in progress. The intended purpose of change in labeling by the addition of the boxed warning is to strengthen the warnings in the label and to mitigate the risk of serious hypersensitivity reactions including anaphylaxis in order to enhance patient safety.

CLINICAL RELEVANCE/APPLICATION

Ferumoxytol remains safe for MRI in the vast majority of patients, with a very small risk of serious adverse event, and personnel should be prepared to treat such reactions if they were to occur.

RC505-13 Moving Towards Quantitative Brain Tumor Imaging

Wednesday, Dec. 2 11:35AM - 12:00PM Location: E451A

Participants

Thomas L. Chenevert, PhD, Ann Arbor, MI (*Presenter*) Consultant, Koninklijke Philips NV

RC506

Sinonasal and Orbital Imaging

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S406B

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC506A Sinonasal Inflammatory Disease

Participants
Rebecca S. Cornelius, MD, Cincinnati, OH (*Presenter*) Stockholder, Gilead Sciences, Inc; Stockholder, HCP, Inc; Stockholder, CVS Health Corporation; Stockholder, 3M Company ; Spouse, Stockholder, Gilead Sciences, Inc; Spouse, Stockholder, HCP, Inc; Spouse, Stockholder, CVS Health Corporation; Spouse, Stockholder, 3M Company; Spouse, Stockholder, Celgene Corporation; Spouse, Stockholder, E. I. du Pont de Nemours & Company

LEARNING OBJECTIVES

1) Recognize imaging findings in chronic rhinosinusitis. 2) Recognize imaging findings of orbital and intracranial complications of sinonasal inflammatory disease. 3) Differentiate between types of fungal sinus disease.

Active Handout:Rebecca Sue Cornelius

http://abstract.rsna.org/uploads/2015/15001949/Active RC506A.pdf

RC506B Sinonasal Tumors

Participants
Ilona M. Schmalfuss, MD, Gainesville, FL, (schmai@radiology.ufl.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe differentiating imaging features between the different sinonasal tumors. 2) Discuss extension patterns of sinonasal malignancies. 3) Outline critical areas of involvement that impact treatment of sinonasal tumors.

RC506C Orbital Differential Diagnosis

Participants
Michelle A. Michel, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recommend optimal imaging modality for evaluating diverse pathology of orbit. 2) Discuss approach to orbital lesion diagnosis based upon patters of disease, patient demographics, and presenting symptoms. 3) Recognize orbital pathologies occurring in key differential diagnoses.

ABSTRACT

Sinonasal Inflammatory DiseaseRhinosinusitis is one of the most commonly diagnosed diseases in the United States, affecting >16% of the US population annually. There are acute, subacute and chronic forms defined by duration. Imaging is indicated in patients with chronic disease. Complications of rhinosinusitis include spread into adjacent superficial tissues, orbital extension and intracranial extension. Types of sinusitis will be defined, characteristics of chronic disease and fungal disease discussed and imaging examples of complications reviewed.Sinonasal TumorsSinonasal tumors (benign and malignant) present with non-specific symptoms such as nasal obstruction or drainage, leading to work up with CT. Associated facial, oral, ocular, or central nervous system symptoms should raise the concern for an advanced, often malignant tumor and evaluated with MRI. Distinguishing imaging features will be presented for the different sinonasal tumors to facilitate the correct diagnosis, prevent complications, determine the extent of the tumor, and provide accurate staging for optimal treatment planning purposes and improved patient prognosis.Orbital Differential DiagnosisOrbital pathology is diverse and lesions can appear similar on imaging. There are differential diagnoses (DDx) to understand that aid in making an accurate diagnosis. Clinical information should also be correlated with imaging findings. The DDx's that will be discussed include: intraocular lesions, ocular calcification, optic nerve-sheath complex lesions, intraconal lesions, extraconal lesions, extraocular muscle enlargement, infiltrative lesions, and lacrimal gland lesions. Although there are a large number of pathologies that can affect the orbit, knowledge of these key differential diagnoses, patterns of disease, and clinical features can be very helpful to the imager in distinguishing these lesions.

Active Handout:Michelle A. Michel

http://abstract.rsna.org/uploads/2015/15001951/RC506C-Active.pdf

RC507

Bladder, the Forgotten Organ: Role of CT, MRI, and PET in Diagnosis, Staging, and Surveillance of Cancer

Wednesday, Dec. 2 8:30AM - 10:00AM Location: N229

GU CT MR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Stuart G. Silverman, MD, Brookline, MA, (sgsilverman@partners.org) (*Coordinator*) Author, Wolters Kluwer nv
Andrew B. Rosenkrantz, MD, New York, NY (*Presenter*) Nothing to Disclose
Homer A. Macapinlac, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the latest developments on the role of CT, MRI, and PET/CT in the detection, diagnosis, staging, and surveillance of patients with bladder cancer. 2) Learn currently recommended CT, MRI, and PET/CT techniques and protocols and how to implement them in clinical practice. 3) Learn how to interpret CT, MRI, and PET/CT scans of the bladder with an emphasis on case review and diagnostic pitfalls.

ABSTRACT

The urinary bladder is the most common site of malignancy of the urinary tract and is imaged by radiologists on many abdominal imaging exams. However, historically the bladder has been a 'forgotten' organ and thought to be largely the purview of the urologist due to the central role that cystoscopy has played in both the diagnosis and local staging of bladder cancer. Recent advances in CT, MRI, and PET have emerged that now allow radiologists to play an important role in the detection, diagnosis, staging, and surveillance of patients with or suspected of having bladder cancer. This course will detail these advances and explain how, when, and why radiologists should be using these three modalities in clinical practice today. Using illustrative case examples, advances in knowledge such as how CT urography can be used to detect bladder cancer, how MR urography can be used to distinguish muscle-invasive from superficial tumors and evaluate the upper tracts, and how PET/CT (and the newly introduced PET/MRI) can be used to stage and follow patients. With additional advances in low dose CT, emerging MRI techniques, and novel PET agents, radiology will play an increasingly vital role in the care of patients with bladder cancer in the future.

RC508

Trauma Imaging Pitfalls

Wednesday, Dec. 2 8:30AM - 10:00AM Location: E353C

ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC508A Chest Trauma Imaging Pitfalls

Participants
Felipe Munera, MD, Miami, FL, (fmunera@med.miami.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the MDCT findings of Aortic Diaphragmatic injuries. 2) Describe potential diagnostic pitfalls and mimics aortic and diaphragmatic injuries.

ABSTRACT

Thoracic injuries are the third most common injuries in blunt trauma. The purpose of this lecture is not an exhaustive review of all the potential traumatic thoracic injuries but rather to focus on two areas of particular concern, acute traumatic aortic injury and diaphragmatic injuries. Key imaging findings and potential pitfalls in recognizing blunt and penetrating traumatic injuries to the diaphragm and thoracic aorta will be discussed. Diagnosing aortic and diaphragmatic injuries each present unique challenges. Recognition of traumatic aortic and diaphragmatic injuries is important to allow for timely treatment, as delays in diagnosis can lead to increased morbidity and mortality.

RC508B Abdominal Trauma Imaging Pitfalls

Participants
Michael N. Patlas, MD,FRCPC, Hamilton, ON, (patlas@hhsc.ca) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1)To discuss common pitfalls in interpretation of cases of blunt and penetrating abdominal trauma. 2)To analyze factors leading to errors. 3)To discuss advantages of different phases of imaging and multiplanar reconstructions (MPRs) for detection of traumatic injuries.

ABSTRACT

MDCT have led to a paradigm shift in the management of abdominal injuries minimizing the role of laparotomy. To this end, an awareness of pitfalls of MDCT detection of these injuries is of increasing importance. Bowel and mesenteric injuries are uncommon. Delayed diagnosis of bowel and mesenteric injuries may result in disastrous complications and high mortality rates. This presentation will focus on imaging pearls and pitfalls in detection of blunt and penetrating bowel and mesenteric injuries. The presentation will also cover pitfalls in diagnosis of pancreatic, biliary, adrenal and ureteric injuries.

RC508C Pelvic Trauma Imaging Pitfalls

Participants
Guillermo P. Sangster, MD, Shreveport, LA, (gsangs@lsuhsc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss potential imaging pitfalls and mimics that may be misinterpreted as traumatic pelvic injuries. 2) Substantiate the advantages of Multidetector computed tomography (MDCT) for the screening of stable patients suspected to have traumatic pelvic injuries. 3) Differentiate intra and extraperitoneal pelvic injuries in patients suffering blunt and penetrating trauma.

ABSTRACT

Pelvis traumatic injuries range from benign to life threatening conditions. MDCT is the imaging modality of choice for evaluation of hemodynamically stable patients with pelvic trauma. This live activity demonstrates the benefits of MDCT in the detection and pre-operative planning of patients sustaining pelvic injuries. Subtle signs should be recognized for timely diagnosis, and familiarity with potential mimics is key to avoid unnecessary procedures.

RC508D Extremity Trauma Imaging Pitfalls

Participants
O. Clark West, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify extremity injuries that are difficult detect on screening radiographs. 2) Illustrate search patterns that may improve detection of easily missed injuries. 3) Design clinical pathways using advanced imaging and/or follow-up radiography to detect radiographically occult injuries.

ABSTRACT

Take home messages:•Posterior shoulder dislocation: narrow gleno-humeral joint, loss of parallel articular surfaces, fixed internal rotation on multiple views andtrough impaction fracture.•Supracondylar fracture: anterior humeral line should intersect middle 50% of capitellum on well positioned lateral view.•Monteggia fracture-dislocation: radio-capitellar line should intersect the capitellum in ALL projections•Proximal radius-Vertical head fracture (external oblique view)-Impacted neck fracture-Flipped radial head fracture-dislocation•Galeazzi fracture-dislocation - beware ascribing DRUJ dislocation to poor positioning of lateral radiograph.For trauma, obtain 3 views of joints:•Axillary view of shoulder•External oblique of elbow•Wrist 4 view: PA, lateral, external oblique and "Scaphoid" view (ulnar deviated PA view)•Pearl for the day: watch for the least obvious of multiple injuries

Handout:O. Clark West

http://abstract.rsna.org/uploads/2015/15003347/WestOC_Trauma Imaging Pitfalls Upper Extremity_RSNA 2015 Handout.pdf

RC509

Gastrointestinal Series: Advances in Abdominal CT

Wednesday, Dec. 2 8:30AM - 12:00PM Location: E350

GI CT

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Daniele Marin, MD, Cary, NC (*Moderator*) Nothing to Disclose
Avinash R. Kambadakone, MD, Boston, MA (*Moderator*) Nothing to Disclose
Ravi K. Kaza, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

RC509-01 Radiation Dose Reduction in CT

Wednesday, Dec. 2 8:30AM - 8:50AM Location: E350

Participants
Amy K. Hara, MD, Scottsdale, AZ (*Presenter*) Royalties, General Electric Company;

LEARNING OBJECTIVES

1) Compare advantages and disadvanatages of various techniques to reduce radiation dose for abdominal CT. 2) Describe how iterative reconstruction techniques work and how they can improve image quality of low dose exams. 3) Develop a strategy to implement low dose techniques in clinical practice.

Honored Educators

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Amy K. Hara, MD - 2015 Honored Educator

RC509-02 Intra-Patient Comparison of Standard, BMI-based and Attenuation-based Tube Voltage Selection in Abdominal MDCT: Effect on Dose and Image Quality Parameters

Wednesday, Dec. 2 8:50AM - 9:00AM Location: E350

Participants
Faezeh Sodagari, MD, Chicago, IL (*Presenter*) Grant, Siemens AG
Adeel R. Seyal, MD, Chicago, IL (*Abstract Co-Author*) Grant, Siemens AG
Atilla Arslanoglu, MD, Chicago, IL (*Abstract Co-Author*) Grant, Siemens AG
Fernanda D. Gonzalez Guindalini, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Vahid Yaghmai, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Intra-patient comparison of abdominal MDCT radiation dose and image quality parameters when using attenuation-based automated tube voltage selection versus standard and BMI-based selections .

METHOD AND MATERIALS

This study was IRB approved and HIPAA compliant. Abdominal MDCT scans of fifty patients who had been imaged with both standard protocol (120 kV and filtered-back-projection reconstruction algorithm) and new protocol (automated kV selection and iterative reconstruction) were compared. Data was also analyzed based on BMI-based kV selection (100 kV if BMI <25 kg/m2). Radiation dose, image noise (subcutaneous fat), SNR (aorta and liver) and CNR (aorta and liver) were recorded. P<0.05 was considered significant.

RESULTS

Patient mean BMI was comparable between the two studies (24.6 kg/m2 for first study and 24.7 kg/m2 for second study; P=0.77). With automated tube voltage selection protocol, 43/50 (86%) were scanned with 100 kV, 5/50 (10%) with 120kV and 2/50 (4%) with 140kV. BMI for 100kV group ranged between 17.8 and 29.925 kg/m2. Sixteen patients scanned with 100kV had BMI ≥25 kg/m2. If BMI <25 kg/m2 would have been utilized as cut-off point for 100kV san, 30% fewer patients would have been scanned with 100kV (28 vs 43). Compared with standard protocol, CDTIvol, DLP, and effective dose decreased 17.2%, 20% and 20.4%, respectively, in 43 patients that were automatically selected for 100kV scan. Image noise decreased by 21.7% (P<0.001) while CNR and SNR of liver and aorta increased >24% (P<0.001).

CONCLUSION

Attenuation-based automated tube voltage selection results in lower tube voltage in significantly higher number of patients, compared with standard and BMI-based selections. Image quality parameters improve with combination of lower tube voltage selection and iterative reconstruction.

CLINICAL RELEVANCE/APPLICATION

Attenuation-based automated tube voltage selection results in significantly higher number of patients imaged with lower dose

compared with BMI-selection.

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Vahid Yaghmai, MD - 2012 Honored Educator
Vahid Yaghmai, MD - 2015 Honored Educator

RC509-03 Oral Contrast Media Concentration Selection for Low kVp/keV CT Scanning

Wednesday, Dec. 2 9:00AM - 9:10AM Location: E350

Participants
Manuel Patino, MD, Boston, MA (*Presenter*) Nothing to Disclose
Diana Murcia, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Andrea Prochowski Iamurri, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Yasir Andrabi, MD, MPH, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Avinash R. Kambadakone, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Dushyant V. Sahani, MD, Boston, MA (*Abstract Co-Author*) Research Grant, General Electric Company; Research Consultant, Allena Pharmaceuticals, Inc

PURPOSE

Oral contrast media is commonly used for abdominal CT. Clinical implementation of low-kVp/DECT imaging demands adjustments in OCM concentration. The purpose of our study is to evaluate the impact of low X-ray energy (kVp/keV) on OCM using phantom and clinical data, and to assess optimal OCM concentrations for low-energy diagnostic CT scans

METHOD AND MATERIALS

Anthropomorphic CT colo phantom study: Four OCM solutions were used as follows: Water, Gastrografin® (Bracco dx, 9mg/ml), Iohexol (GE healthcare, 12mg/ml), and Barium Sulfate (Readi-CAT® 2.0%). Each solution was diluted with water to obtain 75, 50, and 25% of the standard dose of OCM for adults. The phantom was filled up serially with 400 ml of each OCM solution, from the lowest to the standard OCM concentration, and scanned on ssDECT scanner (Discovery-CT750 HD, GE Healthcare) on SECT (80, 100 and 120 kVp, and 250mA) and DECT modes (140/80 kVp and 375 mA). VMC (40, 50, 60, and 70keV) images were generated yielding a total of 91 image datasets (39 on SECT, and 52 on DECT). Three ROIs were placed at 3 locations in colonic lumen to measure HU, SD and CNR. Clinical study: GI tract attenuation was measured in 50 consecutive patients with standard-dose, positive (barium and iodine) OCM in both SECT and DECT. Multiple ROIs were placed in different locations of the GI tract on 120-SECT and DECT-low keV images to measure HU. Statistical analysis was conducted with pair student t-test

RESULTS

Colonic attenuation in 120kVp-scans with standard OCM dose ranges between 261 and 303 HU. There was an inverse correlation between OCM HU and kVp/keV, irrespective of OCM concentration, increasing HU 2X on low-kVp and 5X on low-keV images ($p<0.05$). There was 5% drop in CNR with low-kVp but 15% increase with low-keV for all OCM's. Clinical abdomen CT exams mirrored phantom results. Optimal OCM dilutions for 100/80kVp scans were: Gastrografin® 75/75%, Iohexol 75/75% and Barium 75/50%. OCM dilutions of 25-50% were optimal on 40-70keV scans

CONCLUSION

Low kVp/keV scans increase GI tract attenuation, enabling OCM dose concentration reduction for diagnostic exams

CLINICAL RELEVANCE/APPLICATION

OCM-customization provides opportunity to optimize IQ, and decrease OCM-related artifacts, allowing better assessment of GI and, adjacent, extra-intestinal pathologies on low X-ray energy CT scans. It might also contribute to reduce radiation dose, associated with tube current modulation

Honored Educators

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Dushyant V. Sahani, MD - 2012 Honored Educator
Dushyant V. Sahani, MD - 2015 Honored Educator

RC509-04 Intravenous Contrast Issues

Wednesday, Dec. 2 9:10AM - 9:30AM Location: E350

Participants
John R. Leyendecker, MD, Dallas, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the risks of intravenous administration of iodinated CT contrast media. 2) To be familiar with the latest information on the use of iodinated CT contrast media in the setting of renal impairment. 3) To be familiar with potential future developments in intravenous CT contrast agents.

RC509-05 The Application of Spectral CT in Reducing Contrast Medium Dosage in Abdominal CT: Comparison between the Lower Contrast Injection Protocol (350mgI/kg)

Wednesday, Dec. 2 9:30AM - 9:40AM Location: E350

Participants
Lei Yuxin, MMed, Xianyang City, China (*Presenter*) Nothing to Disclose
Xiaoxia Chen, MMed, Xianyang City, China (*Abstract Co-Author*) Nothing to Disclose
Ma Chunling, MMed, Xianyang City, China (*Abstract Co-Author*) Nothing to Disclose
Zhanli Ren, Xianyang, China (*Abstract Co-Author*) Nothing to Disclose
Qi Yang, Xianyang, China (*Abstract Co-Author*) Nothing to Disclose
Tian Xin, MMed, Xianyang City, China (*Abstract Co-Author*) Nothing to Disclose
Qiang Tian, Xian, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the feasibility of using spectral CT in contrast-enhanced abdominal scans to reduce the total dosage of contrast medium while maintaining image quality.

METHOD AND MATERIALS

Prospectively randomized 44 contrast-enhanced abdominal CT patients to 2 groups: group A (n=22) using spectral CT with 350mgI/kg contrast injection protocol; group B (n=22) with the conventional 120kVp with 500mgI/kg. The injection rate was adjusted to have the total injection time of 25s for both groups. For the 120kVp scan, tube current (m A) was automatically adjusted to achieve noise index (NI) of 10, and for spectral CT, a m A was selected based on the average of the min and max m A from the 120kVp m A table for NI=10. CT dose index (CTDI) and effective dose were recorded. CT number and standard deviation (SD) of the abdominal aorta in arterial phase (AP), portal vein in venous phase (VP), liver parenchyma and erector spinae on the 120kVp images and 60keV spectral CT images were measured to calculate contrast-noise-ratio (CNR). Measurements were compared with t-test.

RESULTS

The body mass index between 2 groups showed no difference (p>0.05). For the 60keV spectral CT images, CT number and CNR were (359.00±53.21HU, 51.52±12.56) for abdominal aorta and (185.32±22.90HU, 20.63±6.19) for portal vein. These values were higher than the respective values of (306.03±46.36HU, 44.52±13.43) and (149.25±19.66HU, 15.11±3.65) for the 120kVp images. The SD values in erector spinae of the spectral CT images were 5.88±0.99HU in AP and 6.05±0.99HU in VP, statistically the same as those of the 120kVp images (5.90±1.43HU in AP and 5.85±0.73HU in VP) (P>0.05). The CTDI and effective dose were (14.28±2.61mGy, 6.63±1.21mSv) for spectral CT and (13.55±4.73mGy, 6.23±2.08mSv) for 120kVp CT with no difference (p>0.05). On the other hand, group A with spectral CT achieved 30% contrast dose reduction at 350mgI/kg compared with the conventional 120kVp group.

CONCLUSION

Compared with the conventional 120kVp CT, spectral CT can reduce the total contrast dosage by 30% and at the same time improves the vessel contrast enhancement and CNR without radiation dose increase.

CLINICAL RELEVANCE/APPLICATION

Spectral CT can reduce the total contrast dosage by 30% and improves vessel enhancement and CNR without radiation dose increase.

RC509-06 Dual-Energy CT and Virtual Monoenergetic Reconstructions: Utility of Novel and Basic Algorithms in Assessment of Intestinal Wall Enhancement and Applications for Acute Intestinal Ischemia

Wednesday, Dec. 2 9:40AM - 9:50AM Location: E350

Participants
Pedro Lourenco, MD, Vancouver, BC (*Presenter*) Nothing to Disclose
Ryan Rawski, BSc, MSc, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Patrick D. McLaughlin, FFRRCSI, Cork, Ireland (*Abstract Co-Author*) Speaker, Siemens AG
Tim O'Connell, MD, Meng, Vancouver, BC (*Abstract Co-Author*) President, Resolve Radiologic Ltd; Speake, Siemens AG
Savvas Nicolaou, MD, Vancouver, BC (*Abstract Co-Author*) Institutional research agreement, Siemens AG

PURPOSE

Acute bowel ischemia and infarction are devastating abdominal emergencies, with reported mortality rates up to 93%. CT sensitivity for detection of acute bowel ischemia is poor, in particular in the diagnosis of early bowel ischemia, and CT findings are often non-specific. Virtual monoenergetic reconstructions allow for optimized enhancement and evaluation of bowel wall for signs of ischemia and infarction. The basic algorithm has limited utility given high noise and signal to noise. Here, we evaluate the utility of a novel (VMI+) and the basic (VMI) virtual monoenergetic algorithms in acute bowel ischemia.

METHOD AND MATERIALS

18 patients with pathologically confirmed bowel ischemia or infarction presented to a quaternary hospital. Abdominal DECT (100 and 140 keV) were obtained at the time of presentation. Axial series were reconstructed with VMI+ and VMI software application (Monoenergetic Basic and Plus, Dual Energy, Siemens) and evaluated for improved noise reduction, and the reconstructions were compared with virtual 120-keV series that blended spectral information from high and low keV datasets. Images were considered to lie within the sweet spot if noise level was < 40 HU.

RESULTS

Utilizing the novel algorithm broadened the sweet spot of diagnostically acceptable monoenergetic keV levels by 416%. With VMI+, the mean diagnostic range was 57-190 keV (SD 9.3 and 0.0, respectively), whereas using VMI, mean diagnostic range was 69 -101 keV (SD 3.9 and 13.0, respectively). SNR and CNR were also significantly improved utilizing the VMI+ technique, by 107 and 76%, respectively. CNR utilizing the VMI+ algorithm at 50, 100 and 150 keV was 4.90 (SD 1.44) 3.18 (SD 1.44) 1.26 (SD 0.71), respectively, while VMI algorithm CNR was significantly inferior, at 2.39 (SD 0.92), 1.54 (SD 0.61) and 0.35 (SD 0.18). Intestinal wall enhancement was maximized at 40 keV, given the maximal CNR (5.18 SD 1.42), which allows for optimal assessment of bowel wall at this level, albeit tolerating lower SNR.

CONCLUSION

The "sweet spot" for virtual monoenergetic reconstructions was significantly increased when utilizing the VMI+ algorithm, with a diagnostic keV range increased by approximately 400%. SNR and CNR also demonstrate marked improvement by 107 and 76%, respectively, with VMI+ over VMI.

CLINICAL RELEVANCE/APPLICATION

The VMI+ reconstructions are markedly superior to the basic VMI algorithm, and are useful in assessing bowel wall enhancement.

RC509-07 Patient Size-independent Monoenergetic Imaging for Detection Hypervascular Liver Tumors: Impact of a Second-generation Monoenergetic Algorithm

Wednesday, Dec. 2 9:50AM - 10:00AM Location: E350

Participants
Daniele Marin, MD, Cary, NC (*Presenter*) Nothing to Disclose
Juan Carlos Ramirez-Giraldo, PhD, Malvern, PA (*Abstract Co-Author*) Employee, Siemens AG
Sonia Gupta, MD, Newark, DE (*Abstract Co-Author*) Nothing to Disclose
Sandra Stinnett, MS, MPH, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Rendon C. Nelson, MD, Durham, NC (*Abstract Co-Author*) Consultant, General Electric Company Consultant, Nemoto Kyorindo Co, Ltd Consultant, VoxelMetrix, LLC Research support, Bracco Group Research support, Becton, Dickinson and Company Speakers Bureau, Siemens AG Royalties, Wolters Kluwer nv
Ehsan Samei, PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Achille Mileto, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Wanyi Fu, BEng, Durham, NC (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the impact of a novel monoenergetic reconstruction algorithm on the conspicuity of hypervascular liver tumors during dual-energy CT (DECT) of the liver.

METHOD AND MATERIALS

This retrospective, single-center HIPAA-compliant study was IRB-approved and informed patient consent was waived. Fifty-nine patients (35 men, 24 women) with 47 hypervascular liver tumors underwent DECT (80/Sn140 kVp) in the late hepatic arterial phase, with a dual-source CT system (Siemen Definition Flash). Datasets at energy levels ranging from 40 to 100 keV were reconstructed using first and second-generation monoenergetic algorithms (Syngo DE Monoenergetic and Monoenergetic Plus, respectively). Noise and tumor-to-liver contrast-to-noise ratio (CNR) were calculated and compared among different reconstructed datasets. The effect of patient's effective diameter on lesion CNR was also assessed. P-values were obtained for paired difference using generalized estimating equations (GEE) to account for multiple lesions per patient.

RESULTS

Noise was significantly lower and tumor-to-liver CNR significantly higher between 40 and 60 keV energies using a second- compared to a first-generation monoenergetic algorithm ($P < .001$ for all comparisons). The highest tumor-to-liver CNR was achieved using the second-generation monoenergetic algorithm at 40 keV, with an approximately 25% improvement in CNR compared to a first-generation algorithm at the optimal energy of 70 keV (Mean [SD] = 4.99 [1.70] vs. 3.80 [2.40]; $P < .001$). Our data showed that patient body size did not significantly affect the selection of the optimal monoenergetic level using the second-generation monoenergetic algorithm. This is in contrast with the significant impact of body size in the selection of the optimal energy level with the first-generation algorithm.

CONCLUSION

The second-generation monoenergetic algorithm significantly improves the conspicuity of hypervascular liver tumors compared to a first-generation algorithm, while simultaneously decreasing the variability introduced by patient's body weight in selecting the optimal monoenergetic level.

CLINICAL RELEVANCE/APPLICATION

A second-generation monoenergetic algorithm improves the conspicuity of hypervascular liver tumors and may streamline the workflow of DECT by decreasing the variability related to patient's body size.

RC509-08 Dual Energy CT

Wednesday, Dec. 2 10:10AM - 10:30AM Location: E350

Participants
Alvin C. Silva, MD, Scottsdale, AZ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the basic principles and different approaches for Dual-Energy CT. 2) Review common Dual-Energy CT post-processing displays. 3) Describe strategies for implementing Dual-Energy CT in clinical practice.

ABSTRACT

RC509-09 Variability and Effect of Degree of Enhancement on CT Attenuation Measurements in Virtual Unenhanced Images Generated from Fast Kilovoltage Switching Dual-energy CT Using Iodine Material Suppression Algorithm

Wednesday, Dec. 2 10:30AM - 10:40AM Location: E350

Participants
Evan A. Raff, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Ravi K. Kaza, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

Mahmoud M. Al-Hawary, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
Matthew S. Davenport, MD, Cincinnati, OH (*Abstract Co-Author*) Book contract, Wolters Kluwer nv; Book contract, Reed Elsevier;
Katherine E. Maturen, MD, Ann Arbor, MI (*Abstract Co-Author*) Consultant, GlaxoSmithKline plc; Medical Advisory Board, GlaxoSmithKline plc
Amit Pandya, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
Joel F. Platt, MD, Superior Township, MI (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine the rate and magnitude of CT number discrepancies between true unenhanced images (TUE) and virtual unenhanced images (VUE) generated from a fast kilovoltage switching dual-energy CT scanner using iodine material suppression algorithm.

METHOD AND MATERIALS

In this IRB-approved HIPAA-compliant retrospective cohort study, 21 multi-phasic abdominal CT examinations (unenhanced, corticomedullary [CM], nephrographic [NG]) obtained on a fast kilovoltage switching dual-energy CT scanner (GE, Milwaukee, WI) were reviewed. VUE images were generated from both dual-energy post-contrast phases using Material Suppressed Iodine (MSI) algorithm. CT numbers were measured on the matched TUE, VUE, and post-contrast images at predefined locations in the liver, pancreas, spleen, left kidney, main portal vein, aorta, and erector spinae muscle. 725 regions of interest were placed at 145 locations. The correlation between VUE and TUE CT numbers was assessed with Pearson's correlation coefficient. Absolute CT number discrepancies and 95% confidence intervals (CI) were calculated for each VUE and TUE comparison. The effect of phase of enhancement on CT number discrepancies was assessed with ANOVA.

RESULTS

Overall, VUE and TUE measurements were not significantly different ($p=0.29$), and there was a very strong correlation between VUE and TUE CT numbers in both post-contrast phases (CM: $r=0.91$, NG: $r=0.93$, $p<0.001$). The mean difference between TUE and VUE images was 1 HU (95% CI: -7 to +9 HU) for CM phase imaging and 2 HU (95% CI: -6 to +10 HU) for NG phase imaging. Discrepancies ≥5 HU occurred 36 times (25%, 36/145) in the CM phase and 33 times (23%, 33/145) in the NG phase. Discrepancies ≥10 HU were rare in both phases (n=4 [CM], n=2 [NG]). Inter-phase VUE imaging differed by a mean of 0.7 HU (95% CI: -7 to +8 HU) between the CM and NG phases in the same subject, with 26 discrepancies ≥5 HU (18%, 26/145) and 3 discrepancies ≥10 HU (2%, 3/145). There was no significant correlation between the degree of enhancement and the magnitude of VUE-TUE discrepancies ($r = 0.23$).

CONCLUSION

CT numbers on VUE images generated from fast kilovoltage switching dual-energy CT scans have a very strong positive correlation to TUE CT numbers and are similar on a population level, but vary on a per-patient level.

CLINICAL RELEVANCE/APPLICATION

Discrepancies in TUE and VUE measurements of 5-9 HU are common and may affect enhancement calculations that rely on VUE data.

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Katherine E. Maturen, MD - 2014 Honored Educator

RC509-10 Optimization of CT Protocol Using Integrated Automated Protocol Selection Software (GSI Assist) in Single-source Rapid Kilovoltage-switching Spectral CT: The Effect on Radiation Dose

Wednesday, Dec. 2 10:40AM - 10:50AM Location: E350

Participants
Amir Borhani, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Alessandro Furlan, MD, Pittsburgh, PA (*Abstract Co-Author*) Author, Reed Elsevier; Research Grant, General Electric Company
Mark A. Sparrow, MD, Pittsburgh, PA (*Presenter*) Nothing to Disclose
Matthew H. Kulzer, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Mitchell E. Tublin, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Negar Iranpour, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

GSI Assist (GE®) is an automated software which helps with selection of optimal dual-energy CT (DECT) scan parameters based on patient's size and desired level of noise. This software uses scout-based attenuation characteristics to select an appropriate preset that will match (within 20%) the dose of a single-kvp CT scan (SECT). The purpose of this study is to evaluate the radiation dose when using GSI Assist for abdominal CT protocols and to compare the radiation dose of DECT with matched SECT.

METHOD AND MATERIALS

113 consecutive patients who underwent dual-energy CT of the abdomen, using a single source rapid kvp-switching DECT scanner (HD750 GE), were retrospectively reviewed. 43 patients (56 CT examinations) had matched SECT examinations (with comparable noise index, similar collimation, similar body part, and similar phase of contrast) within 2 years. The body part scanned, phase of study, absorbed dose (CTDIvol), dose-length product (DLP), effective dose (ED; using conversion factor of 0.015), body mass index (BMI), and weight were recorded for each scan. CTDIvol, DLP, and ED were compared between matched SECT and DECT examinations using paired t-test. Effect of weight, BMI, and phase of imaging on DECT radiation dose was also evaluated using linear regression analysis and Bland-Altman plot.

RESULTS

Mean CTDIvol and ED were 10.98 mGy (4.26-26.4; SD=5.95) and 7.68 mSv (2.1-21.2; SD=4.2) for DECT as compared to 11.6 mGy

(3.3-25.2; SD=7) and 7.9 mSv (1.7-20.6; SD=4.9) for matched SECT studies, respectively. These values were not statistically different (p=0.4 and 0.7, respectively). DECT radiation dose had significant correlation with patient's weight (R^2=0.55; p<0.001) and BMI (R^2=0.72; p<0.001), similar to SECT. Although DECT dose to patients with extreme weights (<65kg or >130kg) and extreme BMI (<18 or >30) was slightly higher, the correlation was not statistically significant (R^2 of 0.15 and 0.07, respectively).

CONCLUSION

There was no statistical difference between radiation dose of DECT and single-kvp CT when an automated software (GSI Assist) was used for optimal protocol selection. The average radiation dose from DECT was well below ACR reference level.

CLINICAL RELEVANCE/APPLICATION

Automated protocol selection software (GSI Assist) allows choosing the optimal abdominal CT technique on single-source dual-energy CT while maintaining the dose at the level of single-kvp CT dose.

RC509-11 Advances in Oncologic Imaging

Wednesday, Dec. 2 10:50AM - 11:10AM Location: E350

Participants
Meghan G. Lubner, MD, Madison, WI, (mgsaur@yahoo.com) (*Presenter*) Grant, General Electric Company; Grant, NeuWave Medical, Inc; Grant, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Briefly define established size-related oncologic response criteria used in CT. 2) Discuss application of volumetric assessment of tumor burden at diagnosis and in assessing response to therapy. 3) Briefly describe selected examples of response assessment criteria looking at other tumor imaging characteristics such as tumor attenuation or enhancement in addition to size. 4) Examine CT tumor texture analysis as an additional tool to evaluate tumor heterogeneity at baseline and during therapy.

ABSTRACT

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Meghan G. Lubner, MD - 2014 Honored Educator
Meghan G. Lubner, MD - 2015 Honored Educator

RC509-12 Texture Characteristics and Mutational Status of Primary Colorectal Cancer

Wednesday, Dec. 2 11:10AM - 11:20AM Location: E350

Participants
Cinthia Cruz, MD, Boston, MA (*Presenter*) Nothing to Disclose
Synho Do, PhD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
James H. Thrall, MD, Boston, MA (*Abstract Co-Author*) Board Member, Mobile Aspects, Inc; Board Member, WorldCare International Inc; Consultant, WorldCare International Inc; Shareholder, Antares Pharma, Inc; Shareholder, iBio, Inc ; Shareholder, Peregrine Pharmaceuticals, Inc
Debra A. Gervais, MD, Chestnut Hill, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine whether there is an association between texture energy of primary lesions of colorectal cancer and their mutational status.

METHOD AND MATERIALS

A total of 24 cases were included. The most frequent mutations [single nucleotide polymorphisms (SNP)] found in a previous study with a cohort of 713 subjects of our institution, were analyzed. Five wild type (WT) tumors, 5 BRAF, 5 KRAS, 4 TP53 and 4 NRAS mutant (M) primary tumors were delineated and extracted from the pretreatment portal-venous phase 5mm slice thickness contrast enhanced CTs, creating a mask. For each phenotype we concatenated acquired texture energy measurements (TEV) for each slice of tumor to form a matrix (N by 9), where N is the number of slices. We computed more than 2000 pixels for each slice and, pixel spacing was normalized to 0.5 mm. Matrixes were used for statistical analysis. Texture analysis was performed using software developed by the laboratory of medical imaging and computation from our institution which includes normalization, filtering, and calculation of texture energy in the primary tumors. Nine different texture energies were compared between genotypes using student T tests, Fisher's Exact Test was used to assess for statistical significance.

RESULTS

Significant differences were found on WT: M texture energy values (TEV)-3,4,5,8 and 9 at 59: 65, 41:47, 30: 37, 63: 72 and 31: 39 (p= 0.005, 0.002 and <0.001 for the latter); on WT: KRAS on TEV-4,5,8 and 9 at 41: 46(p<0.001), 30: 39 (p<0.001), 63: 71 (p=0.003) and 31: 38 (p<0.001). WT: NRAS was significantly different for all TEV-1 through 9(p<0.001), at 724: 838 (16%), 268: 315(17%), 58: 77(33%), 40: 54(35%), 30:40 (31%), 303: 381(26%), 189: 236(25%), 63:78 (24%) and 31:44 (39%). NRAS was most significantly associated with TEVs greater than 16% of WT tumors (p<0.001).

CONCLUSION

Wild type tumors, KRAS and NRAS mutants were found to have distinct texture energy patterns compared with other tumors. WT showed significantly lower texture energy values than mutant tumors. NRAS was most significantly associated to high energy values relative to WT.

CLINICAL RELEVANCE/APPLICATION

Known associations of single nucleotide polymorphisms and clinical and imaging features play a pivotal role in treatment of colorectal cancer. Texture energy analysis is another tool for characterizing tumors using imaging data that can help us to guide genetic-driven biopsies and possibly treatments.

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Debra A. Gervais, MD - 2012 Honored Educator

RC509-13 N-Staging in Primary Rectal Cancer: Can CT-Perfusion Differentiate between Malignant and Non-Malignant Pelvic Lymph Nodes? Preliminary Results from a Prospective, Blinded Feasibility Study Comparing CT-Perfusion Findings to Histopathology.

Wednesday, Dec. 2 11:20AM - 11:30AM Location: E350

Participants
Zahra Kassam, MD, London, ON (*Presenter*) Nothing to Disclose
Kyle Burgers, London, ON (*Abstract Co-Author*) Nothing to Disclose
Joanna Walsh, London, ON (*Abstract Co-Author*) Nothing to Disclose
Errol E. Stewart, PhD, London, ON (*Abstract Co-Author*) Nothing to Disclose
Pavlo Ohorodnyk, MD, London, ON (*Abstract Co-Author*) Nothing to Disclose
Barbara J. Fisher, MD, London, ON (*Abstract Co-Author*) Nothing to Disclose
Ting-Yim Lee, MSc, PhD, London, ON (*Abstract Co-Author*) Research Grant, General Electric Company Royalties, General Electric Company

PURPOSE

To determine whether CT-Perfusion has the potential to distinguish between malignant and non-malignant lymph nodes in patients with primary rectal cancer.

METHOD AND MATERIALS

18 patients with rectal cancer were evaluated preoperatively with CT-perfusion (CT-P). Dynamic CT-P of the pelvis was performed following IV contrast injection. All visible pelvic lymph nodes were categorized qualitatively by the radiologist as being positive or negative for malignancy. Wherever possible, the inguinal lymph nodes of each patient were used as internal negative controls. Analysis of the lymph nodes included: (1) Visual CT interpretation by the radiologist, (2) CT-Perfusion, and (3) Histopathology (standard of reference). The visual and CT-Perfusion analysis were done independently, by different reviewers. The lymph nodes were assessed for blood flow, blood volume, mean transit time and capillary permeability. Patients with T2 disease were treated surgically with total mesorectal excision (TME); while those with T3/4 or node-positive disease underwent neoadjuvant therapy, followed by repeat CT-P.The nodes within the TME specimen were organized into perirectal zones according to a pre-established regional lymph node map. Ultrastaging of the lymph nodes was performed at 2 mm sections. The pathologist was blinded to the imaging and perfusion results.

RESULTS

Visual interpretation yielded 100 abnormal and 68 normal nodes; sensitivity was 1.0 and specificity was 0.33.CT-P demonstrated a pattern of peripheral perfusion in malignant nodes, while reactive nodes demonstrated homogeneous perfusion. Overall blood flow in non-malignant nodes was significantly higher than in malignant nodes ($p<0.000$). Analysis revealed 31 abnormal and 104 normal nodes (some nodes could not be evaluated due to motion artifact). Sensitivity was 1.0 and specificity increased to 0.87. The lower size limit for technical lymph node evaluation by CT-P was 3.2 mm.

CONCLUSION

CT-Perfusion shows early promise in N-staging of primary rectal cancer, even in nodes <5 mm. Qualitative N-staging by conventional CT could potentially overstage disease.

CLINICAL RELEVANCE/APPLICATION

Accurate N-staging of small nodes by conventional imaging methods can be challenging. Early results suggest that N-staging by CT-Perfusion has the potential to positively impact patient management, in the settings of (1) Initial diagnosis, (2) Response to therapy, and (3) Assessment of recurrence.

RC509-14 Dual Energy CT Utilization in Clinical Practice: Impact on Workflow and Radiation Doses

Wednesday, Dec. 2 11:30AM - 11:40AM Location: E350

Participants
Yasir Andrabi, MD, MPH, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Manuel Patino, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Rani S. Sewatkar, MBBS, Edison, NJ (*Abstract Co-Author*) Nothing to Disclose
Andrea Prochowski Iamurri, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Farhad Mehrkhani, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Avinash R. Kambadakone, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Dushyant V. Sahani, MD, Boston, MA (*Presenter*) Research Grant, General Electric Company; Research Consultant, Allena Pharmaceuticals, Inc

PURPOSE

The growing demand for dual energy (DE) CT has introduced workflow challenges and radiation dose concerns. Therefore we studied the impact of increased DE CT utilization on the CT workflow and radiation doses of cancer FU exams performed in last 2 years.

METHOD AND MATERIALS

In this IRB approved retrospective analysis, 20,325 cancer FU CT exams (age=61.6 years, weight=76.8 kg) performed between Dec 2012 - Mar 2015 on 5 of our scanners (GE Healthcare=3, Siemens=2) were included. Two GE scanners (Discovery CT750 HD) have DE capability and iterative reconstruction algorithms (IRT; ASiR) and remaining 1 is a single energy (SE) scanner (Light Speed Pro) with FBP algorithm. Both Siemens scanners have IRTs (SAFIRE); DE is present on one scanner (Flash). Exams were stratified into 3 groups: Group1: DE exams (DE-GE, DE-Siemens), Group2: SE-FBP and Group3: SE-IRT (ASiR,SAFIRE). Radiation doses were retrieved and compared between different groups and National Averages.

RESULTS

The DE CT constituted 41% of all cancer FU exams (DE-GE=8089, DE-Siemens=208) compared to 59% SE exams (SE-FBP=2075; SE-ASiR=6647; SE-SAFIRE=3306). Three fold increases in DE CT utilization was noted (21% in 2012 and 67% in 2015) with an overall slight increase in the total number of CT exams performed on these scanners. The radiation doses for DE CT exams were substantially (47%) lower than National averages (DIR). Doses were comparable to SE-FBP exams (CTDI(mGy); Group1=10.6 (DE-GE=12.1, DE-Siemens=9.2); Group2=12.4;$p>0.05$) and nearly 13% higher than SE-IRT scans (Group3=9.3mGy(SE-ASiR=9.6,SE-SAFIRE=8.9); $p<0.05$). A16% reduction in DE-CT doses were noted in 2015 compared to 2012.

CONCLUSION

There is a threefold increase in the utilization of DE-CT exams for cancer FU exams from last 2 years. DE-CT radiation doses are substantially (47%) lower than national averages, comparable to our institutional SE-FBP cancer FU exams and 13% higher than our SE-IRT scans. There is also a 16% reduction in DE-CT doses from 2012.

CLINICAL RELEVANCE/APPLICATION

There is an increase in DE-CT utilization due to its growing clinical applications. These exams have different acquizition and postprocessing demands, thus, raising work flow and radiation dose concerns. Our study indicates that DE CT exams do not interfere with the work flow and the radiation doses are also in the acceptable range for diagnostic CT exams.

RC509-15 CT Workflow Issues

Wednesday, Dec. 2 11:40AM - 12:00PM Location: E350

Participants
Dushyant V. Sahani, MD, Boston, MA (*Presenter*) Research Grant, General Electric Company; Research Consultant, Allena Pharmaceuticals, Inc

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Dushyant V. Sahani, MD - 2012 Honored Educator
Dushyant V. Sahani, MD - 2015 Honored Educator

RC510

Second and Third Trimester Obstetrical Ultrasound (An Interactive Session)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: E450B

GU OB US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC510A 3D Ultrasound in Obstetrics

Participants
Beryl R. Benacerraf, MD, Brookline, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn the principles of 3D sonography and the applications for fetal scanning. To evaluate clinical situations where 3D scanning is helpful and where it is not useful beyond the 2D examination. 2) To see examples of fetal malformations scanned in 3D using surface rendering and multiplanar reconstruction. 3) To learn how to use volume scanning to dramatically reduce scan time and improve you scanning efficiency by rescanning stored volumes of complete fetal anatomy.

ABSTRACT

Three-dimensional (3D) ultrasound allows us to acquire a volume and display any plane of section within that volume regardless of the scanning orientation. The ability to display a 3D image of any type or plane has been one of the most powerful recent advances in sonography, particularly in the field of obstetrics and gynecology. In imaging of the fetus, 3D ultrasound is advantageous in demonstrating many types of fetal defects and dysmorphologic facial features using surface rendering. The fetal brain is also one of the areas where 3D ultrasound has been most helpful, since the reconstruction of the third non-scanning plane is crucial in demonstrating planes of section not previously visible sonographically. The corpus callosum is an example of one area not readily imaginable in standard imaging planes. The fetal sutures are also easy to image with 3D, which is particularly helpful in fetuses with suspected craniosynostosis. 3D ultrasound is key for imaging fetal skeletal abnormalities, providing additional information on affected fetuses as compared to 2D. Evaluation of the spine using 3D has been helpful to determine the level of spina bifida, thus providing crucial information regarding prognosis. Evaluation of the fetal heart is an intense area of research interest, and the heart can be imaged in realtime 3D (4D) using a method called STIC. This method provides the ability to obtain a full volume of the beating heart to evaluate in detail off line with or without color Doppler and while it is beating.Volume imaging is also key in improving efficiency of the ultrasound department. The entire fetus can be imaged easily by acquiring and archiving a few volumes. This way, the patient can spend far less time in the ultrasound room and the entire scan can be done remotely and virtually using the stored volumes. This techniques reduces operator dependency usually associated with 2D ultrasound.

RC510B Fetal Genitourinary Anomalies

Participants
Roya Sohaey, MD, Portland, OR (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Apply the Urinary Tract Dilation classification system to fetal imaging practice. 2) Develop an anatomic approach for differential diagnosis of urinary tract obstruction. 3) Develop an understanding of which cases would benefit from fetal MR.

ABSTRACT

By the conclusion of this course, the participant will be able to apply the prenatal UrinaryTract Dilation (UTD) classification system for diagnosis and follow-up planning. The learner will develop an anatomic approach towards differential diagnosis for obstructive causes of UTD, renal cystic dysplasia and complex genitourinary anomalies. In addition, a fetal sex-based approach for analysis of complex lower tract anomalies will be discussed. The course will demonstrate how fetal MR is useful as a problem solving tool in certain complex cases. The lecture is didactic and case-based in format.

RC510C Placenta

Participants
Sara M. Durfee, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the cause of vaginal bleeding in patients with placental abnormalities that include placenta previa and placental abruption. 2) Describe the sonographic features of placenta accreta. 3) Define trophotropism and describe how this process leads to both normal and abnormal placentation.

ABSTRACT

After this presentation, the participant will understand how the normal placenta develops and how factors such as trophotropism lead to placental abnormalities. Specific abnormalities such as placenta previa, placental abruption and placenta accreta will be

addressed in detail. In addition, first trimester abnormalities such as the chorionic bump and subchorionic hematomas will be discussed. The presenter will describe the sonographic appearance of succenturiate lobe, circumvallate placenta and sonolucencies within the placenta and will comment on placental masses.

RC511

Nuclear Medicine Series: Non-FDG PET Radiotracers in Oncology

Wednesday, Dec. 2 8:30AM - 12:00PM Location: S505AB

CT NM OI

ARRT Category A+ Credits: 3.50
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
Hossein Jadvar, MD, PhD, Los Angeles, CA, (jadvar@med.usc.edu) (*Moderator*) Nothing to Disclose
David A. Mankoff, MD, PhD, Philadelphia, PA (*Moderator*) Speaker, Koninklijke Philips NV; Consultant, General Electric Company

Sub-Events

RC511-01 Proliferation Imaging: FLT/PET in Oncology

Wednesday, Dec. 2 8:30AM - 9:00AM Location: S505AB

Participants
David A. Mankoff, MD, PhD, Philadelphia, PA (*Presenter*) Speaker, Koninklijke Philips NV; Consultant, General Electric Company

LEARNING OBJECTIVES

1) Describe the kinetics of thymidine relevant to FLT PET imaging. 2) Discuss approaches to FLT image interpretation. 3) Describe studies that have tested FLT PET as a marker cancer response to treatment.

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David A. Mankoff, MD, PhD - 2013 Honored Educator

RC511-02 Positron Emission Tomography (PET) Imaging of Chemokine Receptor CXCR4 in Patients with Solid Cancers: Initial Results

Wednesday, Dec. 2 9:00AM - 9:10AM Location: S505AB

Participants
Tibor Vag, MD, PhD, Munich, Germany (*Presenter*) Nothing to Disclose
Carlos Gerngross, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Hans-Jurgen Wester, Munchen, Germany (*Abstract Co-Author*) CEO, SCINTOMICS GmbH
Markus Schwaiger, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

CXCR4 is a chemokine receptor that is overexpressed in various human cancers and is involved in tumor metastasis. In this feasibility study we performed Positron Emission Tomography (PET) imaging of CXCR4 expression in patients suffering from various solid cancers.

METHOD AND MATERIALS

21 patients with histologically proven solid tumors underwent PET imaging using the novel CXCR4 nuclear probe [68Ga]Pentixafor. Maximum standardized uptake values (SUVmax) of the liver, spleen and bone marrow were measured for determination of physiological tracer distribution. For evaluation of in vivo CXCR4 expression on tumors, SUVmax and tumor-to-background ratios (T/B ratio) were determined in a total of 43 malignant lesions including 8 primary tumors, 3 local recurrent tumors and 32 metastases. When available, SUVmax of malignant lesions was compared to corresponding SUVmax measured in standard routine [18F]FDG PET.

RESULTS

Moderate tracer uptake was detectable in the liver, bone marrow and spleen with a mean SUVmax of 3.1, 3.7 and 5.6, respectively. By visual interpretation criteria, 9 of 11 primary and local recurrent tumors were detectable, exhibiting a mean SUVmax of 4.7 (range 2.1 to 10.9) and a mean T/B ratio of 2.9. 20 of 32 evaluated metastases were visually detectable (mean SUVmax of 4.5, range 3.2 to 13.8; mean T/B ratio of 2.8). Spearman´s correlation revealed a low correlation between SUVmax and number of lesions per patient (r=0.3). Compared to [18F]FDG PET obtained in 10 patients, tracer uptake in [68Ga]Pentixafor PET revealed a lower SUVmax in all measured lesions.

CONCLUSION

PET Imaging of CXCR4 in patients with solid cancers is feasible. Based on the experience gained within this small number of patients, SUVmax of malignant solid tumors seems to be lower in [68Ga]Pentixafor PET compared to [18F]FDG PET. Moreover, CXCR4 expression in solid malignancies seems to be highly heterogeneous depending on factors, that have to be elucidated in further studies.

CLINICAL RELEVANCE/APPLICATION

Once the areas of Pentixafor imaging are more clearly defined, PET imaging of CXCR4 might prove as a valuable modality, either as a

stand alone diagnostic tool, or in combination with [18F]FDG PET, i.e. when considering [68Ga]Pentixafor for monitoring CXCR4 directed pharmacological or endoradiotherapeutic treatment.

RC511-03 Dual-tracer (11C-acetate and 18F-FDG) PET/CT in Evaluating Gastrointestinal Stromal Tumors and Predicting the Mitotic Rate

Wednesday, Dec. 2 9:10AM - 9:20AM Location: S505AB

Participants
Thomas K. Cheng, MBBS, Hong Kong, Hong Kong (*Abstract Co-Author*) Nothing to Disclose
Sirong Chen, Hong Kong, Hong Kong (*Presenter*) Nothing to Disclose
Yim Lung Leung, Hong Kong, Hong Kong (*Abstract Co-Author*) Nothing to Disclose
Ka Nin Wong, Hong Kong, Hong Kong (*Abstract Co-Author*) Nothing to Disclose
William Cheung, Hong Kong, Hong Kong (*Abstract Co-Author*) Nothing to Disclose
Chi Lai Ho, Hong Kong, Hong Kong (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

18F-FDG (FDG) PET/CT is useful in risk stratification of Gastrointestinal stromal tumors (GIST) because it provides information for 3 predictors of tumor aggressiveness: mitotic rate (MiR), tumor size and primary site of involvement. GIST typically demonstrates high FDG avidity but false negative (FN) reports are not uncommon in those with low MiR. This study explores the detection sensitivity of 11C-acetate (ACT) and FDG PET/CT in GIST, and their relationship to cellular mitotic behavior.

METHOD AND MATERIALS

From 2013-14, 10 patients (M:7, F:3; mean age=63±17y) with primary GIST and 6 patients (M:5, F:1; mean age=66±13y) with metastatic GIST (primary excised previously) underwent preoperative ACT and FDG PET/CT. Postoperative pathology confirmed all primary/secondary GIST. The MiR was categorized as low (≤5/50) or high (>5/50 mitoses/50 high-power fields) according to the mitotic index recommended by NCCN guidelines. ROC curve analysis was performed to explore the relationship of lesion SUVmax to MiR for ACT and FDG, respectively.

RESULTS

10 lesions were found in 10 patients with primary GIST (stomach:5, small bowel:4, omentum:1): 3 with high and 7 with low MiR (size:14.2±11.2 vs 3.7±0.7cm). FDG PET/CT was positive in 7/10 (70%) but FN in 3/7 lesions with low MiR. ACT PET/CT was positive in 9/10 (90%) including all 3 FDG-negative lesions. 6 metastatic GIST patients presented with 11 lesions (liver:2, adrenal:1, retroperitoneal lymph node:1, peritoneum:7): 6 with high and 5 with low MiR. FDG PET/CT was positive in 8/11 (73%) but FN in 1/6 with high and 2/5 with low MiR. ACT PET/CT was positive in all metastatic lesions (11/11:100%). The incremental value of ACT over FDG is significant for primary and metastatic GIST with low MiR (both $P<0.05$). By ROC curve analysis, a FDG SUVmax cut-off value>=4.4 and 3.1 could differentiate lesions of high from low MiR for primary and metastatic GIST, respectively (AUC=0.905 vs 0.875, both $P<0.05$).

CONCLUSION

Metabolic avidity of GIST for FDG has a predictive value for cellular mitotic behavior, but with the disadvantage of FN for lesions having low MiR. ACT PET/CT has a distinct incremental value over FDG for detecting primary/metastatic GIST, but appears to be independent of mitotic behavior.

CLINICAL RELEVANCE/APPLICATION

ACT PET/CT has a high sensitivity for both primary and metastatic GIST, particularly for lesions with low mitotic rate and non-avid for FDG. FDG avidity, however, predicts mitotic behavior of GIST.

RC511-04 Monitoring Response to Antiangiogenic Therapy of Non-Small Cell Lung Cancer using 15O-water PET: The Relationship between Tumor Blood Flow and the Prognosis

Wednesday, Dec. 2 9:20AM - 9:30AM Location: S505AB

Participants
Masahiro Yanagawa, MD, PhD, Suita, Japan (*Presenter*) Nothing to Disclose
Keiko Matsunaga, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroki Kato, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Eku Shimosegawa, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Jun Hatazawa, MD, PhD, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Noriyuki Tomiyama, MD, PhD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Osamu Honda, MD, PhD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Takashi Kijima, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Haruhiko Hirata, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomoyuki Otsuka, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Atsushi Kumanogoh, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Bevacizumab (BEV) is a humanized monoclonal antibody that targets circulating vascular endothelial growth factor. The purposes of this study were to evaluate tumor blood flow in patients with non small cell lung cancer (NSCLC) before and after treatment of BEV using 15O-water PET and to examine the tumor blood flow change and time to tumor progression.

RESULTS

In 5 patients without BEV, median of tumor blood flow before and after treatment was 0.3506 and 0.3351, respectively. There was no significant difference (Wilcoxon test, $p=0.81$). Mean time to tumor progression after treatment was 80.4 days (range, 21 to 203). In 6 patients with BEV, median of tumor blood flow before and after treatment was 0.2785 and 0.1777, respectively. There was a significant difference ($p=0.03$). Mean time to tumor progression after treatment was 242.5 days (range, 86 to 413). The mean ratio (Fa/b) of tumor blood flow after BEV to that before BEV was 0.665 ml/cm^3/min (range, 0.231 to 0.899). There was significant correlation between Fa/b and time to tumor progression (Correlation coefficient $r=0.86$, $p=0.03$): large decrease in blood

flow early after treatment of BEV was associated with short time to tumor progression.

CONCLUSION

Mean tumor blood flow decreased within 1-2 days after administration of BEV. Large decrease in blood flow early after treatment of BEV correlated with short time to tumor progression.

CLINICAL RELEVANCE/APPLICATION

The antiangiogenic therapy might not have a benefit for patients with large decrease in blood flow early after treatment of BEV.

RC511-05 68Ga-PSMA-PET/CT in Patients with Renal Cell Cancer: Initial Results

Wednesday, Dec. 2 9:30AM - 9:40AM Location: S505AB

Participants
Lino Sawicki, MD, Dusseldorf, Germany (*Presenter*) Nothing to Disclose
Philipp Heusch, MD, Duesseldorf, Germany (*Abstract Co-Author*) Nothing to Disclose
Christian Buchbender, Duesseldorf, Germany (*Abstract Co-Author*) Nothing to Disclose
Markus Giessing, MD, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Hubertus Hautzel, MD, Juelich, Germany (*Abstract Co-Author*) Nothing to Disclose
Gerald Antoch, MD, Duesseldorf, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

68Gallium (68Ga) labelled prostate specific membrane antigen (PSMA) positron emission tomography / computed tomography (PET/CT) has been shown to be a reliable imaging method for the detection of prostate cancer and its metastases. Immunohistochemic studies revealed that PSMA is also expressed in the neovasculature of other solid tumors, especially renal cell cancer (RCC), making these cancers a potential target for 68Ga-PSMA-PET imaging. The aim of this study was to explore the feasibility of 68Ga-PSMA-PET/CT for detection of RCC in patients.

METHOD AND MATERIALS

Three male patients (mean age 66 years; range 52 - 74) with primary or metastatic RCC (n=2 clearcell RCC; n=1 papillary RCC) prospectively underwent whole body 68Ga-PSMA-PET/CT (mean Mbq: 179,3; Scanner: Siemens Biograph mCT, Siemens Healthcare, Erlangen, Germany). Quantitative assessement of tracer uptake was performed 1 hour after injection (p.i.) by measuring maximum standard uptake values (SUVmax) using isocontour VOIs in histopathologically proven tumor lesions. Additionaly, for each lesion tumor-to-background ratios were claculated.

RESULTS

All primary RCCs and known metastastic sites were detected by 68Ga-PSMA-PET/CT. Average SUVmax in clear cell and papillary RCC tumour lesions was 16.7 and 4.1, respectively. Mean tumor-to-background ratio was 18.6 for clear cell RCC lesions and was 4.1 for papillary RCC lesions.

CONCLUSION

Detection of primary tumors and metastases in RCC patients using 68Ga-PSMA-PET/CT is feasible. 68Ga-PSMA uptake is high in clear cell RCC but rather weak in papillary RCC. Thus the promising diagnostic potential of 68Ga-PSMA-PET/CT rather has to be investigated in clear cell RCC patients.

CLINICAL RELEVANCE/APPLICATION

Since RCCs have high metastatic potential exact staging is crucial. Imaging with CT, MRI but also 18F-FDG-PET/CT offers limited sensitivity. PET/CT using 68Ga-PSMA seems to be a promising alternative.

RC511-06 Hypoxia Imaging: FMISO PET Imaging in Oncology

Wednesday, Dec. 2 9:40AM - 10:10AM Location: S505AB

Participants
Kenneth A. Krohn, PhD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the evolution of tumor hypoxia and its biological implications. 2) Identify the mechanistic changes in tumor biology that will result in tumor resistance and poor patient outcome. 3) Learn novel ways to image tumor hypoxia with focus on FMISO PET imaging. 4) Understand the potential approaches to overcoming the negative impact of hypoxia.

ABSTRACT

The physiological microenvironment for a tumor is largely dictated by abnormal vasculature and metabolism. Many solid tumors develop areas of hypoxia during their evolution caused by unregulated cellular growth, resulting in greater demand on oxygen for energy metabolism. Hypoxia induces a cascade of changes that reflects the homeostatic attempts (highly conserved evolutionally) to maintain adequate oxygenation that may result in tumor cells to adapt by developing more aggressive survival traits; mediated by Hypoxia Inducible Factor (HIF1a) part of the cellular oxygen sensing mechanism. Hypoxic tumors are not effectively eradicated with conventional doses of radiation and show resistance to several chemotherapy drugs. Hypoxia may also result in angiogenesis (itself a marker of tumor aggressiveness) mediated by Vascular endothelial growth factor (VEGF). While angiogenesis is a frequent consequence of hypoxia, some tumors develop extensive angiogenesis without the presence of hypoxia and vice versa. Advances in PET imaging instrumentation, coupled with the development of an increasing array of novel molecular probes, provide opportunities for imaging and selection of appropriate therapies to overcome the cure limiting effects of these two fundamental aspects of tumor microenvironment. The biology of tumor microenvironment related to hypoxia and its effect on patient outcome and developments in imaging technology and novel radiotracers for hypoxia imaging with a focus on F-18 FMISO would be reviewed.Challernges and novel treatments to overcome the cure limiting ability of hypoxia will be discussed.

RC511-07 Prostate Cancer Choline PET Imaging and Other PET Tracers

Wednesday, Dec. 2 10:30AM - 11:00AM Location: S505AB

Participants
Hossein Jadvar, MD, PhD, Los Angeles, CA, (jadvar@med.usc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the major biological targets that may be useful for imaging in prostate cancer. 2) Understand the need for tailoring the imaging technique to the particular clinical phase of disease. 3) Analyze the current evidence with the potential utility of PET with various radiotracers in the imaging evaluation of prostate cancer.

ABSTRACT

ABSTRACT

Recent advances in the fundamental understanding of the complex biology of prostate cancer have provided increasing number of potential targets for imaging and treatment. In this presentation, I review the experience with a number of major PET radiotracers for potential use in the imaging evaluation of men with prostate cancer.

RC511-08 Primary Tumor Detection in CUP of Neuroendocrine Origin: Additional Value of 68Ga-DOTATATE-PET/CT Compared to Contrast-enhanced CT

Wednesday, Dec. 2 11:00AM - 11:10AM Location: S505AB

Participants
Philipp M. Kazmierczak, MD, Munich, Germany (*Presenter*) Nothing to Disclose
Axel Rominger, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Christine Spitzweg, Munich, Germany (*Abstract Co-Author*) Advisory Board, Novartis AG; Advisory Board, Pfizer Inc; Advisory Board, Ipsen SA; Speaker, Novartis AG; Speaker, Pfizer Inc; Speaker, Ipsen SA
Christoph Auernhammer, MD, PhD, Munich, Germany (*Abstract Co-Author*) Research Grant, Novartis AG; Speaker, Novartis AG; Research Grant, Ipsen SA; Speaker, Ipsen SA; Advisory Board, Novartis AG
Maximilian F. Reiser, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Clemens C. Cyran, MD, Munich, Germany (*Abstract Co-Author*) Research Grant, Bayer AG Research Grant, Novartis AG Speakers Bureau, Bayer AG
Carsten Rist, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the additional value of 68Ga-DOTATATE-PET/CT compared to contrast-enhanced CT for primary tumor detection in cancer of unknown primary (CUP) of neuroendocrine origin.

METHOD AND MATERIALS

Patients (n=38, 27 male, 11 female, mean age 62 years) with histologically proven metastatic disease of neuroendocrine origin undergoing contrast-enhanced 68Ga-DOTATATE-PET/CT (Biograph 64, Siemens Healthcare, Erlangen, Germany) for primary tumor detection and staging were consecutively included in this retrospective study. Two blinded readers independently evaluated the separated contrast-enhanced CT and 68Ga-DOTATATE-PET data sets and noted from which of the two imaging modalities they suspected a primary tumor. In case of divergent blinded reading results, a consensus was reached. The final diagnosis, confirmed by either histopathology (n=24) or clinical follow-up (n=14), served as standard of reference.

RESULTS

Primary tumors were suspected in n=33 patients, localized in the small bowel (n=19), the pancreas (n=12), the lung (n=1), and the thyroid gland (n=1) (mean tumor-to-spleen ratio 1.10±0.69; PET/CT: true positive n=30, true negative n=3; CT: true positive n=20, true negative n=5). In n=4 patients, no primary tumor was identified (true negative n=3). N=10 primary tumors were correctly detected by PET but not contrast-enhanced CT, resulting in a diagnostic accuracy of 87 % for the fused 68Ga-DOTATATE-PET/CT, compared to 66 % for the contrast-enhanced CT alone. High interobserver agreement was noted regarding the localization of the primary tumor (Cohen's k 0.90, $p<0.001$).

CONCLUSION

68Ga-DOTATATE-PET/CT provides a significantly higher diagnostic accuracy for primary tumor detection in CUP of neuroendocrine origin as compared to contrast-enhanced CT alone.

CLINICAL RELEVANCE/APPLICATION

The present study provides evidence for the routine use of 68Ga-DOTATATE-PET/CT in neuroendocrine CUP, allowing for a comprehensive tumor staging at improved diagnostic accuracy as compared to standard whole-body imaging.

RC511-09 Do we Need High-Dose Contrast-enhanced CT in the Detection of Extra-hepatic Metastasesusing Gallium-68-DOTATATE-PET/CT in Patients with Neuroendocrine Tumors (NET)?

Wednesday, Dec. 2 11:10AM - 11:20AM Location: S505AB

Participants
Jonas C. Apitzsch, MD, Marburg, Germany (*Presenter*) Nothing to Disclose
Dirk R. Albanus, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Z. Erdem, Zonguldak, Turkey (*Abstract Co-Author*) Nothing to Disclose
Oktay Erdem, MD, Zonguldak, Turkey (*Abstract Co-Author*) Nothing to Disclose
Anton F. Verburg, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Florian F. Behrendt, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Felix Mottaghy, MD, PhD, Ulm, Germany (*Abstract Co-Author*) Nothing to Disclose
Andreas H. Mahnken, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Alexander Heinzel, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Previous studies have shown that PET/CT with 68Ga-labeled somatostatin analogues is useful in the assessment of metastatic disease in in patients with neuroendocrine tumors especially with regard to extra-hepatic lesions. It has to be noted that PET in combination with full-dose contrast-enhanced CT (ceCT) exposes the patients to a high dose of radiation whereas the non-contrast-enhanced low-dose CT (ldCT) might reduce the radiation and may in addition avoid side effects such as allergic reactions. Thus, we aimed to determine whether ceCT can be omitted from assessment for extra-hepatic metastases in patients with NET.

METHOD AND MATERIALS

We retrospectively compared the performance of PET/ldCT and PET/ceCT in 54 patients (26 male, 28 female) who underwent a Gallium-68-DOTATATE-PET/CT in our clinic. Selection criteria were as follows: available ldCT and ceCT; histologically confirmed NET; available follow-up of at least 6 months (median 12.6 months; range 6.1-23.2). PET/ldCT and PET/ceCT images were analyzed separately by four experienced physicians. The review process focused on metastases to lungs, bones and lymph nodes. Afterwards, the PET/ldCT and PET/ceCT results were compared to the reference standard consisting of clinical follow-up data to evaluate the diagnostic accuracy.

RESULTS

In PET/ceCT 139 true positive bone-lesions were detected compared to 140 in PET/ldCT, 106 true positive lymph node metastases (PET/ceCT) vs. 90 (PET/ldCT) and 26 true positive lung lesions (PET/ceCT) whereas PET/ldCT found ?? true positive lung lesions. On a per patient basis ld and ce PET-CT achieved similar sensitivity (both 100%) however, specificity was lower for PET/ldCT (89% vs. 77%). For lymph nodes PET/ceCT showed superior sensitivity and specificity (sensitivity 92% vs. 80% and specificity 83% vs. 65%). For the detection of pulmonary lesions the sensitivity of PET/ldCT was also clearly inferior (23 vs 100%) while specificity was similar (94% vs. 93%).

CONCLUSION

These results represent first evidence that ceCT should not be omitted for extra-hepatic staging using Gallium-68-DOTATATE-PET/CT in patients with neuroendocrine tumors. However, the results need to be confirmed in a prospective trial.

CLINICAL RELEVANCE/APPLICATION

PET/ldCT is sufficient in the detection of extrahepatic metastatic desease in NET. There is no further need for high-dose CeCT.

RC511-10 PSA and PSA Kinetics in Predicting 18F-NaF PET Positivity for First Bone Metastases in Patients with Biochemical Recurrence after Radical Prostatectomy

Wednesday, Dec. 2 11:20AM - 11:30AM Location: S505AB

Participants
James Yoon, BA, Los Angeles, CA (*Presenter*) Nothing to Disclose
Leslie Ballas, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Bhushan Desai, MBBS, MS, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Lingyun Ji, MS, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Susan Groshen, PhD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Hossein Jadvar, MD, PhD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate PSA and PSA kinetics in addition to other pathologic factors to determine their predictive value for 18F-NaF PET positivity for first bone metastases in patients with biochemical recurrence after radical prostatectomy.

METHOD AND MATERIALS

All 18F-NaF PET scans that were performed at USC between 2010 and 2014 were queried to find patients who demonstrate biochemical recurrence after radical prostatectomy. Patients with known metastatic disease at the time of 18F-NaF PET were excluded. Records were reviewed to obtain data on PSA at the time of 18F-NaF PET, PSA kinetics, and pathologic features of the prostatectomy specimen, which were then used for receiver operating characteristic (ROC) analysis to determine predictability for 18F-NaF PET positivity.

RESULTS

36 patients met our inclusion criteria. Of these, 8 (22.2%) had positive 18F-NaF PET scans. Mean values for PSA, PSA doubling time, and PSA velocity were 2.02 ng/mL (range 0.06-11.7 ng/mL), 13.2 months, and 1.28 ng/mL/yr for 18F-NaF PET negative patients and 4.11 ng/mL (range 0.04-14.38 ng/mL), 8.9 months, and 9.06 ng/mL/yr for 18F-NaF PET positive patients (p=0.07, 0.47, and 0.02 respectively). ROC analysis for 18F-NaF positivity gave AUC values of 0.634 for PSA, 0.598 for PSA doubling time, and 0.688 for PSA velocity. ROC analysis with combined models gave AUC values of 0.723 for PSA and PSA doubling time, 0.689 for PSA and PSA velocity, and 0.718 for PSA, PSA doubling time, and PSA velocity. There was no significant association found between 18F-NaF PET positivity and Gleason score, TN staging, and status of surgical margins.

CONCLUSION

18F-NaF PET detected first time osseous metastases in 22.2% of patients with PSA relapse. PSA velocity was the best single variable for predicting 18F-NaF PET positivity. Combining PSA with PSA doubling time or PSA with PSA doubling time and PSA velocity resulted in higher predictability than any variable independently.

CLINICAL RELEVANCE/APPLICATION

18F-NaF PET can detect early prostate cancer bone metastases in the post-prostatectomy setting.

RC511-11 Bone PET Imaging: NaF PET in Oncology

Wednesday, Dec. 2 11:30AM - 12:00PM Location: S505AB

Participants
Baris Turkbey, MD, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To identify the advantages of F-18 NaF PET/CT in oncology 2) To understand the importance of a standardized imaging protocol and reporting for F18-NaF PET/CT 3) To become comfortable in differentiating benign lesions from malignant ones on F18-NaF PET/CT

ABSTRACT

F-18 NaF PET/CT has been shown to have higher sensitivity than planar 99m-Tc MDP bone scanning in several studies. The concomitant acquisition of anatomic images permits immediate correlation of any abnormal findings. Additionally, F-18 NaF PET/CT bone imaging can be quantitated, allowing bone disease to be 'measureable', increasing its utility therapy monitoring. When a consistent F-18 NaF uptake period is used, the SUV values are highly reproducible, and due to the high extraction fraction, high quality images can be obtained with a radiation dose exposure similar to that of Tc-99m MDP (including the low dose CT scan). This presentation will discuss the benefits and challenges of F-18 NaF PET/CT in oncology.

ABSTRACT

F-18 NaF PET/CT has been shown to have higher sensitivity and specificity than planar 99m-Tc MDP bone scanning in several small studies. The concomitant acquisition of anatomic images permits immediate correlation of any abnormal findings. Additionally, F-18 NaF PET/CT bone imaging can be quantitated, allowing bone disease to be "measureable", increasing its utility therapy monitoring. When a consistent F-18 NaF uptake period is used, the SUV values are highly reproducible, and due to the high extraction fraction, high quality images can be obtained with a radiation dose exposure similar to that of Tc-99m MDP (including the low dose CT scan). This presentation will discuss the benefits and challenges of F-18 NaF PET/CT in oncology.

RC512

Vascular Series: CT Angiography: New Techniques and Their Application

Wednesday, Dec. 2 8:30AM - 12:00PM Location: E352

VA CT

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Dominik Fleischmann, MD, Palo Alto, CA (*Moderator*) Research support, Siemens AG;

Handout:Dominik Fleischmann

http://abstract.rsna.org/uploads/2015/15003239/Fleischmann_RSNA2015_Contrast.pdf

Sub-Events

RC512-01 Iterative Image Reconstruction

Wednesday, Dec. 2 8:30AM - 8:55AM Location: E352

Participants
Norbert J. Pelc, ScD, Stanford, CA (*Presenter*) Research support, General Electric Company; Research support, Koninklijke Philips NV; Consultant, Varian Medical Systems, Inc; Consultant, NanoX; Scientific Advisory Board, RefleXion Medical Inc; Scientific Advisory Board, Prismatic Sensors AB; Medical Advisory Board, OurCrowd, LP ;

LEARNING OBJECTIVES

1) Understand the basic concepts behind iterative reconstruction algorithms. 2) Understand the differences between these methods and conventional reconstruction. 3) Appreciate the potential advantages and disadvantages of iterative methods.

ABSTRACT

For many decades, essentially all CT images have been reconstructed using an "analytic" algorithm, such as filtered backprojection. These methods are computationally efficient, allowing fast image reconstruction, and if the raw data are of high quality the images can be exact. As the dose is reduced or if there are deterministic errors in the data, analytic reconstruction may produce lower image quality than may be possible. Iterative reconstruction methods can build in knowledge of measurement noise and other errors and yield higher image quality. They can produce lower noise images in low dose settings and in some cases higher spatial resolution. Iterative methods are generally nonlinear, meaning that the image quality depends on the object being scanned. They also produce images whose properties are "non-stationary", meaning that the image quality can vary significantly across the image. Understanding these allows the user to best evaluate their performance and appropriately use them in clinical settings.

RC512-02 Impact of Iterative Reconstruction and Improved Spatial Resolution in CT Angiography (CTA) of Fenestrated Stent Grafts

Wednesday, Dec. 2 8:55AM - 9:05AM Location: E352

Participants
Terri J. Vrtiska, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Juan Montoya, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Thanila A. Macedo, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Thomas A. Foley, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Ying Huang, MD,PhD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Nikkole Weber, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Cynthia H. McCollough, PhD, Rochester, MN (*Abstract Co-Author*) Research Grant, Siemens AG
Joel G. Fletcher, MD, Rochester, MN (*Abstract Co-Author*) Grant, Siemens AG; ;

PURPOSE

To determine if improved spatial resolution and advanced model iterative reconstruction (IR) could improve confidence or reduce artifacts at CTA in patients with fenestrated stent grafts (FSGs).

METHOD AND MATERIALS

Patients with FSGs underwent 2 CTA exams, one using a CT system with IR and improved spatial resolution (System A: Somatom Force, Siemens), and the other without IR (System B: Somatom Definition Flash or Sensation 64, Siemens). A kV selection/chart and identical slice thickness were used for both exams. Anonymized images from each system were reviewed by a 2 radiologists in side-by-side comparison, with readers specifying preference and rationale. In a separate session, readers evaluated each artery with a stent for stenosis (0=none to 3=>80%) and intraluminal artifacts (0=none to 4=non-diagnostic). Occlusion, in-stent neointimal hyperplasia, and kinks were also noted (present vs. not). Confidence for each parameter was recorded (0=uncertain to 9=completely confident). Slice-specific CTDIvol at the proximal portion of each artery was recorded from the DICOM header.

RESULTS

21 pts with FSGs having 73 vessels with stents (14 Celiac, 18 SMA, 41 renal) underwent CTA on both CT systems. System A used lower tube potentials across the study cohort. The slice-specific CTDIvol with System A was lower (mean diff -13%). In 86% (36/42) of side by side comparisons, System A was preferred due to better in-stent visualization (n=8), less noise (n=22), and fewer artifacts (n=14). System B was preferred in 5 cases with increased metal artifacts but lower slice-specific radiation dose. When in-slice radiation dose of System A was ≥ 10% lower than System B, mean intraluminal artifacts scores were lower for System A (1.8 vs. 2.1, $p<0.01$) and confidence for in-stent stenosis was higher (7.2 vs. 6.5, $p<0.002$). Otherwise, there was no

difference in artifact score, stenosis, occlusion, kink or artifact (p>0.34), except that System B had a higher confidence for neointimal hyperplasia (7.6 vs. 6.8, p=0.02).

CONCLUSION

Improved spatial resolution and IR were visually preferred in unblinded comparisons, and resulted in higher confidence for in-stent visualization at lower relative doses.

CLINICAL RELEVANCE/APPLICATION

Improved spatial resolution and IR can improve confidence and reduce stent-related artifacts at lower dose levels, which facilitates surveillance in patients with fenestrated endografts.

RC512-03 Assessment of Adamkiewicz Artery Using Low Dose Multi-detector Computed Tomography with Novel Iterative Model-based Reconstruction Technique

Wednesday, Dec. 2 9:05AM - 9:15AM Location: E352

Participants
Tae Hyun Nam, Seongnam-Si, Korea, Republic Of (*Presenter*) Nothing to Disclose
Eun Ju Chun, MD, PhD, Seongnam-Si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyo Jin Kim, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Bon Seoung Gu, Seongnam, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Soon Ahn Kwon, Seongnam-si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Gwan Hong Min, Seongnam-si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare the visualization of the Adamkiewicz artery (AKA) on multi-detector computed tomography (MDCT) with novel iterative model-based reconstruction (IMR) in comparison to the iterative reconstruction (iDOSE) and filtered back projection (FBP) when the low dose CT protocol was applied.

METHOD AND MATERIALS

Forty patients (male 65.0%, mean age 65±16 years) with aortic aneurysm or dissection who underwent 256-slice MDCT with low dose CT protocol (100 kVp and 20 mA) were enrolled. Acquired raw data were reconstructed by using FBP, median level of iDOSE (iDOSE4) and IMR, and analyzed blindly by two observers. In the quantitative analysis, the signal-to-noise ratio (SNR) of the aorta and contrast-to-noise ratio (CNR) of the anterior spinal artery relative to the spinal cord were measured on multi-planar reformatted images. In qualitative analysis, the visualization of the AKA and its continuity with the intercostal or the lumbar artery were evaluated by using a four-point scale (1, poor to 4, excellent). The visualization scale of 3 or 4 was considered assessable. The one-way analysis of variance was used to evaluate the image quality of three reconstruction algorithm.

RESULTS

The interobserver agreement was good for SNR (k=0.94) and fair for CNR (k=0.73). In qualitative analysis, both SNR and CNR of IMR (SNR, 29.4±7.3; CNR, 4.8±1.7) were significantly higher than iDOSE (SNR, 20.3±6.2; CNR, 3.7±1.4) and FBP (SNR, 14.3±3.1, CNR, 3.2±1.2) (P<.05 for all comparisons). The visualization of AKA was also significantly better in IMR (3.7±0.5) from than iDOSE (3.0±0.9) and FBP (2.5±0.7) (p-value <.05). The prevalence of the assessable AKA was highest in IMR (87.5%) followed by iDOSE (70.0%) and FBP (42.5%) (p<0.05).

CONCLUSION

IMR algorithm led to improving the visualization of the AKA compared to the use of iDOSE and FBP when the low dose CT protocol was applied.

CLINICAL RELEVANCE/APPLICATION

Presurgical localization of the AKA is very important for protecting the spinal cord injury. As compared to iDOSE and FBP, novel IMR algorithm is helpful for evaluation of the AKA.

RC512-04 CT-angiography (CTA) with Low kV and Low Contrast Medium Volume Using a 256 Multi Detector CT Scanner (MDCT) in the Evaluation of Abdominal Aorta Disease: Diagnostic Efficacy and Radiation Dose Reduct

Wednesday, Dec. 2 9:15AM - 9:25AM Location: E352

Participants
Cammillo R. Talei Franzesi, Milan, Italy (*Presenter*) Nothing to Disclose
Davide Ippolito, MD, Monza, Italy (*Abstract Co-Author*) Nothing to Disclose
Davide Fior, MD, Monza, Italy (*Abstract Co-Author*) Nothing to Disclose
Pietro A. Bonaffini, MD, Monza, Italy (*Abstract Co-Author*) Nothing to Disclose
Maria V. Schiavone, MD, Monza, Italy (*Abstract Co-Author*) Nothing to Disclose
Sandro Sironi, MD, Monza, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To reduce the radiation dose exposure and the contrast medium volume by using low-kV setting CT-angiography (CTA) protocol, in the evaluation of abdominal aorta disease.

METHOD AND MATERIALS

From January 2013 to December 2014, 60 patients (23 women and 37 men; mean age 64.2 years; range, 34-83 years) with abdominal aorta disease were prospectively enrolled in our study. All patients underwent 256 MDCT scan examination of abdominal aorta (Brilliance-iCT, Philips, NL). Thirty-four patients were evaluated using low-dose radiation protocol (100 kV; automated tube current modulation) and low-contrast volume (30 mL; 4 mL/s; 350 mgI/mL). Twenty-six patients, as control group, underwent standard CTA protocol (120 kV; automated tube current modulation), with 80 mL of contrast medium volume. Intravessels density

measurements (HU) were performed manually drawing a region of interest (ROI) in the lumen of abdominal aorta, renal arteries and common iliac arteries. The radiation dose exposure (dose-length product, DLP; CT dose index, CTDIvol) and the signal-to-noise-ratio (SNR) were calculated. The obtained data were then compared between the two groups and statistically analysed.

RESULTS

All exams reached high diagnostic quality, permitting to correctly visualize and evaluate the lumen and wall of the main aortic branches. In the study group higher density measurements were observed as compared to control group, in abdominal aorta (mean attenuation value 332 HU vs 318 HU), renal arteries (341 HU vs 305 HU) and common iliac arteries (324 HU vs 311 HU). No significant noise increase was observed in the study group (mean signal to noise ratio, SNR 14.3) in comparison to control group (SNR 18.2). A significant ($p<0.05$) reduction in radiation dose exposure was achieved using low-kV protocol (DLP 335 mGy*cm, CTDIvol 5.8 mGy), as compared to control group (DLP 973 mGy*cm; CTDIvol 19.4 mGy), with an overall radiation dose reduction of 65%.

CONCLUSION

Low kV protocol with low contrast medium volume allows reducing the radiation dose exposure, preserving the renal function, in the evaluation of patients with abdominal vascular disease.

CLINICAL RELEVANCE/APPLICATION

Low-kV protocol with low contrast media volume reduces the radiation exposure, preserving renal function and providing an effective tool for the evaluation of patients with abdominal vascular disease.

RC512-05 Impact of Noise-Optimized Virtual Monochromatic Imaging at Third-Generation Dual-Source Dual-Energy CT Angiography of the Lower Extremity Run-off

Wednesday, Dec. 2 9:25AM - 9:35AM Location: E352

Participants
Julian L. Wichmann, MD, Charleston, SC (*Presenter*) Nothing to Disclose
Matthew R. Gillott, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Carlo N. De Cecco, MD,PhD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Akos Varga-Szemes, MD, PhD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Thomas J. Vogl, MD, PhD, Frankfurt, Germany (*Abstract Co-Author*) Nothing to Disclose
U. Joseph Schoepf, MD, Charleston, SC (*Abstract Co-Author*) Research Grant, Bracco Group; Research Grant, Bayer AG; Research Grant, General Electric Company; Research Grant, Siemens AG; Research support, Bayer AG; ; ;
Ricardo Yamada, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Marcelo Guimaraes, Charleston, SC (*Abstract Co-Author*) Consultant, Cook Group Incorporated ; Consultant, Baylis Medical Company; Consultant, Terumo Corporation; Patent holder, Cook Group Incorporated
Stefanie Mangold, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Giuseppe Muscogiuri, MD, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Stephen R. Fuller, Charleston, SC (*Abstract Co-Author*) Nothing to Disclose
Christian Canstein, Charleston, SC (*Abstract Co-Author*) Employee, Siemens AG

PURPOSE

To assess the impact of a noise-optimized image-based virtual monochromatic imaging algorithm (VMI+) on objective and subjective image quality at third-generation dual-source dual-energy CT angiography (CTA) of the lower extremity run-off.

METHOD AND MATERIALS

We retrospectively evaluated dual-energy CTA studies of the lower extremity run-off in 48 patients (32 male, 16 female; mean age 63.3 ± 13.8 years) performed on a third-generation dual-source CT system. Images were reconstructed with standard linear blending (F_0.5) representing 120-kVp polychromatic acquisition, VMI+ and traditional monochromatic (VMI) algorithms at 40-120 keV energy levels in 10-keV increments. Vascular attenuation and image noise in 18 run-off artery segments were measured; signal-to-noise ratio (SNR) and contrast-to-noise ratio (CNR) were calculated. Two observers used five-point scales to subjectively evaluate vascular attenuation and image noise.

RESULTS

Objective image quality metrics peaked in the 40 and 50 keV VMI+ series (SNR: 20.2 ± 10.7 and 19.0 ± 9.5, respectively; CNR: 18.5 ± 10.3 and 16.8 ± 9.1, respectively) and were significantly (all $P<0.0001$) higher compared to the corresponding 40 and 50 keV VMI series (SNR: 8.7 ± 4.1 and 10.8 ± 5.0; CNR: 8.0 ± 4.0 and 9.6 ± 4.9) and the standard linearly-blended F_0.5 datasets (SNR: 10.7 ± 4.4; CNR: 8.3 ± 4.1). Subjective assessment of attenuation was highest for the 40 and 50 keV VMI and VMI+ image series (range, 4.84-4.91), both superior to F_0.5 (4.07; $P<0.0001$). Corresponding subjective noise assessment was superior for 50 keV VMI+ (4.71; all $P<0.0001$) compared to corresponding VMI (2.60) and F_0.5 (4.11).

CONCLUSION

Image reconstruction with VMI+ at low keV levels (40-50 keV) improves objective and subjective image quality compared to traditional VMI and standard linear blending reconstructions at dual-energy CTA of the lower extremity run-off.

CLINICAL RELEVANCE/APPLICATION

Improved image quality using VMI+ may improve evaluation and diagnosis in lower extremity run-off dual-energy CTA cases with suboptimal vascular opacification and potentially facilitate reduction of iodine load.

RC512-06 Salvage of Suboptimal CT Angiographic Studies Using Virtual Monoenergetic Images from Novel Spectral Detector CT Scanner

Wednesday, Dec. 2 9:35AM - 9:45AM Location: E352

Participants
Hamid Chalian, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Bahar Mansoori, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose

Majid Chalian, MD, Cleveland Heights, OH (*Abstract Co-Author*) Nothing to Disclose
Mojgan Hojjati, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Amar Dhanantwari, PhD, Highland Heights, OH (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Prabhakar Rajiah, MD, FRCR, Cleveland, OH (*Abstract Co-Author*) Institutional Research Grant, Koninklijke Philips NV

PURPOSE

To evaluate the ability of spectral detector CT (SDCT), a novel dual-layer technology to salvage suboptimal CT angiographic studies utilizing retrospectively generated virtual monoenergetic images.

METHOD AND MATERIALS

This study included 17 patients who had CTA on SDCT prototype (Philips Healthcare, Cleveland, OH, USA) and had a suboptimal study, defined as aortic attenuation < 200 HU. Monochromatic image sets were generated at 40, 50, 60, 70, 80 kev. Attenuation, noise, SNR and CNR were measured at ascending aorta (AA), descending aorta (DA), aortic root (AR), LAD, and left ventricle (LV). Subjective evaluation of vascular enhancement, image noise and overall image quality were graded on a 5-point scale (1- Non diagnostic, 5- excellent) by cardiac imager. From the monoenergetic reconstructions, an ideal set was chosen, defined as the highest energy that provided a mean attenuation value of > 200 HU, while maintaining good image quality. At this ideal energy level, attenuation, noise, SNR and subjective image quality were compared to standard 120 kVp polyenergetic study. Paired t-test was used for analysis of quantitative variables. Qualitative analysis was done using Chi-square test.

RESULTS

Mean attenuation in the conventional images was 175.9+/-55.9 HU, 188.9+/-70.4 HU, 178.2+/-67.1 HU, 164.6+/-60.1 HU, and 153.3+/-86.1 HU in the AA, DA, AR, LV, and LAD, respectively. With monochromatic images, there was improved attenuation at 40, 50, 60, 70, 80 keV levels (p value < 0.001 for all) in all pateints. 50 keV image provided the best subjective image quality (4.1 vs. 1.5 on conventional images, p=0.017). Attenuation (175.9+/-55.9 vs. 334.7+/-126.8 HU, p<0.001), SNR (10.5+/-9.0 vs. 18.2+/-14.2, p<0.001) and CNR (16.0+/-13.9 vs. 25.4+/-20.2, p=0.001) of AA was significantly higher at 50 keV as compared to the conventional polychromatic images. Similar trends were seen in other structures. Attenuation, CNR, and SNR increased for 46.5%, 37.5%, and 41.5% at 50 keV compared to conventional 120 keV.

CONCLUSION

All suboptimal CTAs were salvaged using low monoenergetic reconstruction. At the optimal monoenergetic level, the attenuation, SNR, CNR and image quality were significantly higher than that of conventional polychromatic image.

CLINICAL RELEVANCE/APPLICATION

Suboptimal angiographic studies can be salvaged using SDCT, thus obviating the need for additional contrast and radiation.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Prabhakar Rajiah, MD, FRCR - 2014 Honored Educator

RC512-07 Dual-energy and Low kVp CTA

Wednesday, Dec. 2 9:45AM - 10:10AM Location: E352

Participants
Thomas Henzler, MD, Mannheim, Germany, (thomas.henzler@medma.uni-heidelberg.de) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The lecture will review the technical background behind dual-energy CT and primarily acquired low kVp single energy CT angiography. 2) Advantages and disadvantages between dual energy CT angiography and low kVp CT angiography are discussed. 3) Practical advices for different CTA protocols are given. 4) The clinical impact of the techniques regarding radiation dose reduction as well as contrast medium reduction will be discussed.

RC512-08 Implications for Contrast Medium Delivery

Wednesday, Dec. 2 10:20AM - 10:45AM Location: E352

Participants
Dominik Fleischmann, MD, Palo Alto, CA (*Presenter*) Research support, Siemens AG;

LEARNING OBJECTIVES

1) Physics of kVp dependent attenuation of x-rays (see previous lecture). 2) Physiologic principles (rules) of early artrial enhancement following intravenous contrast medium injection. 3) Potential limitations and disadvantages of low-contrast protocols in clinical practice .

ABSTRACT

Advances x-ray tubes technology allow the routine use of lower kVp settings for CT data acquisition. Lower kVp increases the x-ray attenuation of iodine relative to soft tissues, with the potential to either increase vascular opacification for the same contrast medium volume, or decrease the total contrast medium volume while maintaining image contrast.Judicious selection and modification of contrast medium injection parameters requires not only a basic understanding of the physics of kVp-dependent x-ray attenuation of x-rays (see previos presentation in this course), but also a fundamental understanding or early arterial contrast dynamics, and the potential limitations of reducing contrast medium volume for a given cardiovascular CT exam.CONTRAST PHYSIOLOGY: early arterial contrast medium dynamics can be summarized by four basic rules describing arterial opacification as a function of intravenous contrast administration:(1) Arterial enhancement is proportional to the contrast medium injection rate (iodine / second)

(2) Arterial enhancement also increases in a cumulative fashion with a longer injection duration(3) The main physiologic parameter controlling the strength of arterial enhancement is cardiac output(4) For large (runoff) or diseased (aneurysms) vasular territories, the contrast medium transit time within a vascular territory has to be accounted for.LIMITATIONS OF REDUCING CONTRAST MEDIUM VOLUME: While theoretically the contrast/noise ratio may be unchanged when a low kVp / low contrast medium volume protocol is used, such calculations are based on well opacified large vessels, where the high vascular attenuation suggests that an increase in image noise can be tolerated. However, relevant vascular features are often displayed in less attenuated small vessels or vascular borders which are affected by partial volume, and both, 3D visualization and quantitative measurements may in fact be less accurate.Any study-design aimed at assessing a low-contrast medium volume protocol thus requires a rigorous design that proves equal or better image quality. Furthermore - since low-contrast medium volume protcols are inherently justified by the perceived harm of intravenous contrast use - a study design also needs to demonstrate that a new low-dose protocol in fact reduces harm in the population of interest.

RC512-09 Low Contrast Media Volume for CTA of the Aorta: Individualized Protocols Adapted to the Tube Voltage

Wednesday, Dec. 2 10:45AM - 10:55AM Location: E352

Participants
Kai Higashigaito, Zurich, Switzerland (*Presenter*) Nothing to Disclose
Tabea Schmid-Rueegger, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Gilbert Puippe, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Fabian Morsbach, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Thomas Pfamatter, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Hatem Alkadhi, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Daniela B. Husarik, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate into tube voltage-adapted contrast media (CM) volume reduction protocols for CT-angiography (CTA) of the aorta using automated attenuation-based tube voltage selection (ATVS).

METHOD AND MATERIALS

In this prospective, IRB approved study, 190 patients (69.6±11.3 years) undergoing thoracoabdominal CTA with ATVS (ref.kVp=110, ref.mAs=130) on a 192-slice dual-source CT were included. Intravenous contrast media (CM) volume was adapted based on iodine attenuation curves derived from a phantom study and depending on automatically selected tube voltages (range: 80-110kVp at 10kVp intervals). CM volume and injection rate decreased at a maintained bolus length from 110kVp (68 ml@3.6 ml/s) to 80kVp (33 ml@1.8 ml/s). Subjective image quality was assessed by three blinded, independent readers. Objective image quality (aortic attenuation and contrast-to-noise ratio [CNR]) was determined. Volume CT-dose-index (CTDIvol) and size-specific dose estimates (SSDE) were recorded. Cohen's kappa was calculated to evaluate inter-reader agreements. Linear regression was used to assess relationships between selected tube voltage and aortic attenuation/CNR.

RESULTS

62 Patients were imaged at 80kVp, 84 at 90kVp, 33 at 100kVp and 11 at 110kVp. Agreements between the three readers were good for subjective image quality ($\kappa = 0.691$). Diagnostic image quality was achieved in 96.9% of scans. Scans at 80kVp showed mean aortic attenuation of 330±54HU, at 90 kVp 325±54HU, at 100kVp 336±74HU and at 110kVp 387±62HU. CNR values were as follows: 80kVp 15±3, 90kVp 15±4, 100kVp 14±4 and 110kVp 15±4. Linear regression analysis showed no significant correlation between selected tube voltage and mean aortic attenuation ($p= 0.108$) and between selected tube voltage and CNR ($p=0.795$). Mean CTDI was 3.50±0.83mGy and mean SSDE was 4.08±0.72mGy.

CONCLUSION

Individualized adaptation of the CM volume and injection rate to automatically selected tube voltages using ATVS allows for a reduction of CM in CTA of the aorta, while maintaining a constant and diagnostic image quality.

CLINICAL RELEVANCE/APPLICATION

Contrast media can be reduced in an individualized fashion according to the automatically selected tube voltage for CTA of the aorta.

RC512-10 Low Iodine-dose Abdominal CT Angiography Using Low Energy (keV) Images from ssDECT

Wednesday, Dec. 2 10:55AM - 11:05AM Location: E352

Participants
Manuel Patino, MD, Boston, MA (*Presenter*) Nothing to Disclose
Andrea Prochowski Iamurri, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Diana Murcia, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Yasir Andrabi, MD, MPH, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Farhad Mehrkhani, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Rodrigo Canellas, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Mukta D. Agrawal, MBBS, MD, Arlington, MA (*Abstract Co-Author*) Nothing to Disclose
Dushyant V. Sahani, MD, Boston, MA (*Abstract Co-Author*) Research Grant, General Electric Company; Research Consultant, Allena Pharmaceuticals, Inc

PURPOSE

To assess the performance of abdominal angiography with ssDECT using standard- (33 to 35g), low- (21 to 24g) and ultra-low- (16g) iodine dose, compared to SECT angiography with standard-iodine dose. Second, to determine the energy level (keV) for optimal assessment of vascular structures.

METHOD AND MATERIALS

This IRB approved clinical trial was designed in three phases. A total of 105 patients with AAA, scheduled for a follow-up CTA were

enrolled. Each subject had a standard-iodine dose CTA. The follow-up CTA was performed on a ssDECT scanner (Discovery CT750 HD; GE Healthcare), with DECT mode and Iodixanol (GE Healthcare) as follows: Phase 1) 35 patients were scanned with standard-iodine dose (33 to 35g). Phase 2) 64 patients were scanned with 30%-reduced iodine dose (21-24g). Phase 3: 10 patients were scanned with 55%-reduced iodine dose (16g). Virtual monochromatic images (VMC) (40, 50, 60 and 70keV) were generated from arterial-phase DECT images. Two experienced-radiologists evaluated the VMC images for image quality, diagnostic keV-range, optimal keV for vascular assessment, and vascular evaluation. Aortic attenuation was measured and contrast-to-noise-ratio (CNR) was calculated from SECT and VMC images. CTDIvol and DLP were measured and recorded. Statistical analysis was conducted with pair student t-test.

RESULTS

Standard, low and ultra-low-dose DE-CTA exams were rated as high diagnostic quality by the readers (IQ=4.5, 4.2 and 4, respectively). VMC (40 to 70 keV) images were rated diagnostic, and 40 to 50keV were rated optimal for vascular evaluation for all 3 groups. Compared to SE-CTA images, intravascular attenuation and CNR on 40-50keV DECT images were higher at standard (3X/35%), low (2X/30%) and ultra-low (2X/20%) iodine dose ($p<0.001$). Both readers detected 18/18 endoleaks on the DECT scans. Radiation dose was 20-30% lower on DE-CTA, compared to SE-CTA ($p<0.05$).

CONCLUSION

DECT increases intravascular attenuation and CNR enabling substantial iodine dose reduction, compared to SECT. Ultra-low iodine dose DE-CTA is feasible without reduction in diagnostic quality.

CLINICAL RELEVANCE/APPLICATION

DECT allows substantial reduction of iodine dose for CT angiography while rendering high quality images, providing an opportunity to decrease contrast media related renal risks, especially in older patients. These results can be applied to other vascular regions.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Dushyant V. Sahani, MD - 2012 Honored Educator
Dushyant V. Sahani, MD - 2015 Honored Educator

RC512-11 Diagnostic Value of 70 kVp Time-resolved 4D Bone Subtracted CT Angiography with 80 cm -z-axis Coverage in Addition to Static High-pitch CT Angiography: Diagnostic Confidence and Impact on Patient Management

Wednesday, Dec. 2 11:05AM - 11:15AM Location: E352

Participants
Holger Haubenreisser, Mannheim, Germany (*Presenter*) Speaker, Siemens AG; Speaker, Bayer AG
Amir Bigdeli, Ludwigshafen, Germany (*Abstract Co-Author*) Nothing to Disclose
Mathias Meyer, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Philipp Riffel, MD, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Stefan O. Schoenberg, MD, PhD, Mannheim , Germany (*Abstract Co-Author*) Institutional research agreement, Siemens AG
Thomas Henzler, MD, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To prospectively investigate the diagnostic value of time-resolved CT angiography 4D bone subtracted datasets with 80 cm z-axis coverage in addition to static CT angiography in patients with lower limb peripheral arterial occlusive disease (PAOD).

METHOD AND MATERIALS

40 (mean age:71.7yrs;24men) patients with suspected lower limb PAOD underwent a combined CTA protocol consisting of a high-pitch-CTA run-off study starting from the abdominal aorta as well as a time-resolved-CTA of the lower limbs over 80cm (60s total scan time (8x3s, 6x6s); 70kV; 20ml iomeprol400). In addition to the time-resolved series, time-resolved bone subtracted maximum-intensity-projections were generated for each examination. Each of seven lower leg artery segments was rated with regard to contrast and diagnostic confidence (3-point scale) for stenosis assessment. In addition, two radiologists and one vascular surgeon assessed the time-resolved examination regarding additional information leading to changes in patient management.

RESULTS

Compared to the static high-pitch-CTA, time-resolved-CTA datasets with peak contrast enhancement showed significantly higher contrast and CNR in all lower limb vessel segments ($p<0.05$). Diagnostic confidence was rated higher for time-resolved studies when compared to the standard static high-pitch CTA studies (median: time-resolved-CTA: 3[range 2-3]; high-pitch: 2[1-3]). Clinically relevant findings with subsequent impact on patient management that were only visible in the time-resolved-CTA studies were found in 7 of 40 patients, including complete vessel occlusion that was mimicked by extensive calcification.

CONCLUSION

Compared to static high-pitch-CTA, time-resolved-CTA improves arterial contrast enhancement and provides higher diagnostic confidence in patients with suspected lower limb PAOD. Compared to static high-pitch run-off studies, time-resolved studies CTA acquisitions lead to a higher number of clinically important findings that directly influenced patient management.

CLINICAL RELEVANCE/APPLICATION

Adding 70 kVp dynamic CTA examinations to standard static run-off CTA improves diagnostic confidence while retaining low iodine loads, potentially influencing patient management.

RC512-12 Perfusion-based Assessment of Disease Activity in Untreated and Treated Patients with Aortitis and Chronic Periaortitis: Correlation with CT-morphological, Clinical and Serological Data

Wednesday, Dec. 2 11:15AM - 11:25AM Location: E352

Participants
Georg Bier, MD, Tubingen, Germany (*Presenter*) Nothing to Disclose
Jorg Henes, MD, Tubingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Carolin Eulenbruch, Tubingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Theodoros Xenitidis, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Konstantin Nikolaou, MD, Tuebingen, Germany (*Abstract Co-Author*) Speakers Bureau, Siemens AG Speakers Bureau, Bracco Group Speakers Bureau, Bayer AG
Marius Horger, MD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the role of CT perfusion-based assessment of inflammatory activity in patients with treated and untreated aortitis and chronic periaortitis (A/CP) and to compare results with those of clinical and serological markers.

METHOD AND MATERIALS

35 patients (20 female, 15 male) with aortitis/chronic periaortitis (A/CP) and clinical symptoms were examined by whole-body contrast-enhanced computed tomography (CECT) and subsequently by segmental volume perfusion-CT (VPCT) for assessment of the degree of vascularization of A/CP as surrogate marker for inflammatoric activity. Blood flow (BF), blood volume (BV), volume transfer constant (k-trans), time to peak (TTP) and mean transit time (MTT) were determined and the thickness of the increased connective tissue formation was measured. Imaging data was subsequently correlated with clinical symptoms as well as with acute phase inflammatory parameters (C-reactive protein/CRP, erythrocyte sedimentation rate/ESR and leukocyte number).

RESULTS

21/35 patients were untreated, 14/35 had previous of ongoing immunosuppression. The interobserver agreement was good (0.78) for all VPCT parameters. Average values of perfusion parameters were higher in untreated patients, but remained also abnormally elevated in treated patients. Good agreement was found between perfusion data and CRP as well as ESR in aortitis (treated and untreated; $p < 0.05$) and in untreated patients with periaortitis ($p<0.05$).

CONCLUSION

Perfusion-CT parameters in untreated aortitis and periaortitis show good correlation with serological markers with respect to disease activity assessment. In treated periaortitis, however, correlations with serological markers were week or inexistent suggesting an increased rolve for (perfusion-based) imaging.

CLINICAL RELEVANCE/APPLICATION

For the first time the use of a new imaging technique for diagnosis and assessment of disease activity in patients with treated and untreated aortitis and periaortitis is reported. The weak correlation of VPCT with serological parameters in treated periaortitis patients suggests a potentially increased role for VPCT displaying serologically 'occult' disease activity.

RC512-13 Regional Mapping of Aortic Wall Stress Employing Deformable, Motion-Coherent Modeling based on ECG-gated CT Angiography: Exploratory Investigation with Pathodynamic Correlation in a TAVR Population

Wednesday, Dec. 2 11:25AM - 11:35AM Location: E352

Participants
Achille Mileto, MD, Durham, NC (*Presenter*) Nothing to Disclose
Tobias Heye, MD, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Daniele Marin, MD, Cary, NC (*Abstract Co-Author*) Nothing to Disclose
Daniel Boll, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the clinical feasibility of employing deformable, motion-coherent modeling for regional mapping of aortic wall stress in a transaortic valve replacement (TAVR) population undergoing ECG-gated MDCT angiography.

METHOD AND MATERIALS

For this IRB-approved, HIPAA-compliant prospective study we employed thoracic ECG-gated dual-source MDCT angiography (CTA) datasets from 250 consecutive patients (150 men,100 women;mean age, 79.0 ± 9.1 years), who prospectively underwent CTA and echocardiography on the same day. Deformable, motion coherent modeling of aortic wall stress was performed using the PhyZiodynamic framework. The complex aortic motion was dissected into three types of aortic wall translocation, namely longitudinal strain, axial strain, and axial deformation by utilizing exported four-dimensional coordinates for seven anatomic locations, using the Matlab environment.

RESULTS

One hundred fifty-four patients were categorized as having severe aortic stenosis with a mean flow rate of 4.7 ± 0.6 mL/s; 96 patients were categorized with mild to moderate aortic stenosis with a mean flow rate of 3.5 ± 0.6 mL/s. Inverse correlation between heart rate and longitudinal strain ($R2= 0.79$), as well as longitudinal ($R2= 0.95$) and axial strain ($R2= 0.31$) was noted. In contrast, a significant trend towards an increase in axial deformation was observed with progressive increase in heart rate ($P<.001$). These findings indicated that shorter R-R interval may limit aortic motion in the longitudinal and axial planes due to inherent aortic wall rigidity. Increased aortic blood flow in the ascending aorta led to significantly greater longitudinal strain throughout the cardiac contraction cycle ($P<.001$), whereas increasing aortic valve areas led to significantly increased magnitudes in axial deformation ($P<.001$). Longitudinal strain propagating through the aortic wall was predominantly dependent upon the pressure gradients within the aorta. Axial deformation was dependent on the magnitude of passing blood volume.

CONCLUSION

Our study demonstrates the clinical feasibility of deformable, motion-coherent modeling based on ECG-gated MDCT angiography

acquisition for regional mapping aortic wall stress.

CLINICAL RELEVANCE/APPLICATION

Regional mapping of aortic wall stress may provide more objective information on quiescent landing zones suitable for deploying aortic prosthetic grafts, as well as providing insights on atherosclerotic changes of aortic wall.

RC512-14 Post Processing, Workflow and Interpretation

Wednesday, Dec. 2 11:35AM - 12:00PM Location: E352

Participants
Karin E. Dill, MD, Evanston, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the newest post processing techniques currently available for CT angiography. 2) Describe patient-centric imaging and workflow tools which optimize patient care.

ABSTRACT

Rapid evolution of imaging post-processing tools allows for continued advancement in the ability to manipulate data for image interpretation. The newest CTA post processing software will be demonstrated, leading to improved diagnostic capability. Efficient workflow algorithms will be reviewed which center around the patient, bringing multidisciplinary teams together in the workup, diagnosis and treatment of those seeking care. An emphasis will be placed on imaging guidelines which will ultimately be linked to decision support for reimbursement.

RC513

Pediatric Series: Pediatric Oncology and Nuclear Medicine

Wednesday, Dec. 2 8:30AM - 12:00PM Location: S102AB

MR NM RO PD

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.50

FDA Discussions may include off-label uses.

Participants
Sue C. Kaste, DO, Memphis, TN (*Moderator*) Nothing to Disclose
Heike E. Daldrup-Link, MD, Palo Alto, CA (*Moderator*) Nothing to Disclose
Stephan D. Voss, MD, PhD, Boston, MA (*Moderator*) Nothing to Disclose
Robert Orth, MD, PhD, Houston, TX (*Moderator*) Research support, General Electric Company;
Whal Lee, MD, PhD, Seoul, Korea, Republic Of (*Moderator*) Nothing to Disclose

Sub-Events

RC513-01 Bone Mineral Density Changes in Survivors of Childhood Cancer

Wednesday, Dec. 2 8:30AM - 8:50AM Location: S102AB

Participants
Sue C. Kaste, DO, Memphis, TN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Participants will learn risk factors for bone mineral density deficits in patients having been treated for childhood malignancies.

RC513-02 Bone Marrow Edema on MRI as an Indicator of Impending Bone Collapse in Pediatric Cancer Patients on High Dose Corticosteroid Therapy

Wednesday, Dec. 2 8:50AM - 9:00AM Location: S102AB

Participants
Preeti Sukerkar, MD, PhD, Palo Alto, CA (*Presenter*) Nothing to Disclose
Shanshan Bao, MD, Winston Salem, NC (*Abstract Co-Author*) Nothing to Disclose
Sandhya Kharbanda, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose
Stuart Goodman, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Heike E. Daldrup-Link, MD, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Osteonecrosis (ON) is a devastating complication of pediatric cancer therapy with high dose corticosteroids, with 20 % of cases progressing to bone collapse, at which point joint conservation therapy may no longer be possible. It was recently shown in adult ON patients that the presence of bone marrow edema (BME) adjacent to epiphyseal ON is correlated with the presence of micro- or macro-fractures on histopathology, and the puprose of out study is to determine whether BME correlates with eventual bone collapse in pediatric cancer patients to help identify high risk patients who would benefit from early interventions.

METHOD AND MATERIALS

We retrospectively reviewed imaging studies of 18 pediatric leukemia patients who underwent high dose corticosteroid therapy and had findings of epiphyseal ON on magnetic resonance imaging (MRI). Two radiologists evaluated the presence of BME. Follow up imaging was reviewed to determine lesion progression. Using Fisher's exact test, the presence of BME was compared to the patient's outcome.

RESULTS

Of the 18 patients, 12 were found to have pre-collapse ON lesions with sufficient follow up imaging. A total of 36 weight-bearing and 2 non-weight-bearing lesions were identified, of which 13 progressed to collapse and 22 remained stable or improved. The presence of BME was found to be significantly correlated with eventual bone collapse, with 100% of patients who progressed to collapse demonstrating BME on initial imaging ($p < 0.0001$). The absence of BME initially was associated with lesion stability or even improvement ($p < 0.0001$). 3 lesions were identified that progressed slightly but did not collapse, of which none had BME on initial scans.

CONCLUSION

The absence of BME early on is an indicator of future stability or even improvement of an ON lesion, while the presence of BME appears to precede bone collapse. These results suggest that the presence or absence of BME can be used to help identify high-risk patients earlier so they may receive joint preserving therapies. This study is ongoing to evaluate out findings in a larger patient cohort.

CLINICAL RELEVANCE/APPLICATION

Presence or absence of edema on MRI predicts osteonecrosis progression in pediatric cancer patients and is recommended for stratifying high-risk patients for joint preservation therapy.

RC513-03 To Assess the Added Value of Intravenous Gadolinium for Pre-Surgical Evaluation of Osteosarcoma in Long Bones in Pediatric Patients and Young Adults

Wednesday, Dec. 2 9:00AM - 9:10AM Location: S102AB

Participants
Theodore T. Pierce, MD, Boston, MA (*Presenter*) Nothing to Disclose
Randheer Shailam, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Santiago Lozano Calderon, MD, PhD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Pallavi Sagar, MBBS, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Osteosarcoma, a malignant bone tumor, is routinely evaluated using magnetic resonance imaging (MRI) with and without intravenous (IV) gadolinium prior to surgical intervention, typically both at initial staging and following neoadjuvant chemotherapy to determine tumor extent for operative planning. A paucity of data exists showing the utility of preoperative contrast enhanced MRI for operative planning and, so far, gadolinium does not reliably help in differentiating post treatment changes from residual disease. Preoperative parameters such as intramedullary tumor length and transphyseal tumor extension are best evaluated on non-contrast T1 or STIR sequences. Uncertainty remains as to the benefit of IV contrast for evaluating neurovascular bundle involvement (NBI) and intra-articular extension (IAE), key parameters for pre-surgical evaluation.

METHOD AND MATERIALS

At 2 time points, 2 pediatric radiologist independently analyzed MRI examinations of patients between the ages of 0-25 years with pathology proven extremity osteosarcoma for two parameters, NBI and IAE. Initial evaluation analyzed these parameters using non-contrast MRI images only (PRE) and, after 1 week, subsequent evaluation included both the pre and post contrast images (POST). Inter-rater discrepancies were resolved by consensus. Cohen's Kappa and McNemar's test were calculated to assess agreement between PRE and POST image interpretations of NBI and IAE.

RESULTS

56 patients with 90 preoperative MRI examinations were analyzed. PRE and POST interpretations agreed on 47 cases of NBI, 39 cases without NBI, and had 4 discordant cases. There were 63 cases with IAE, 25 without IAE, and 2 were discordant. Kappa was 0.91 for NBI and 0.95 for IAE. McNemar's test did not show a difference between PRE and POST imaging (p=0.61 NBI; p=0.48 IAE).

CONCLUSION

No statistical difference between PRE and POST image interpretation was found. A high level of agreement between PRE and POST image interpretation suggests that non-contrast enhanced MRI may be sufficient for pre-surgical planning for long bone osteosarcoma in pediatric patients.

CLINICAL RELEVANCE/APPLICATION

Avoiding unnecessary gadolinium use limits adverse reaction risk, obviates the need for intravenous access and shortens image acquisition, all of which are of particular benefit in pediatric patients.

RC513-04 Whole Body MRI including Diffusion-weighted Imaging as the Sole Staging and Follow-up Imaging Procedure in Pediatric Tumors - Comparison with Established Imaging Modalities

Wednesday, Dec. 2 9:10AM - 9:20AM Location: S102AB

Participants
Guenther K. Schneider, MD, PhD, Homburg, Germany (*Presenter*) Research Grant, Siemens AG; Speakers Bureau, Siemens AG; Speakers Bureau, Bracco Group; Research Grant, Bracco Group;
Stefan R. Rick, Homburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Peter Fries, MD, Homburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Alexander Massmann, MD, Homburg/Saar, Germany (*Abstract Co-Author*) Nothing to Disclose
Arno Buecker, MD, Homburg, Germany (*Abstract Co-Author*) Consultant, Medtronic, Inc Speaker, Medtronic, Inc Co-founder, Aachen Resonance GmbH Research Grant, Siemens AG

PURPOSE

In 58 pediatric pts. with malignant tumors whole body MRI was evaluated as the sole staging procedure in comparison to established methods such as FDG-PET, MIBG or bone scintigraphy, CT and ultrasound. Findings in follow-up whole body MRI were used for evaluation of tumor response and tumor recurrence, again compared against other established imaging methods. Of particular interest was the detection of late recurrence (> 18 month post initial diagnosis) at time points, at which FDG-PET or MIBG scintigraphy are routinely not available based on actual imaging recommendations.

CONCLUSION

Whole body MRI performed with the described technique can correctly stage and diagnose a variety of malignant tumors in pediatric patients and late recurrence of disease is detected with a high accuracy at time points, at which PET or scintigraphy is routinely not performed.

CLINICAL RELEVANCE/APPLICATION

Inferior accuracy of whole body MRI using only STIR sequences or just DWI was recently published, this study demonstrates the potential of whole body MRI using more advanced techniques. Detection of late recurrence only in MRI highlights the need for advanced MRI in follow-up of pediatric malignancies.

RC513-05 Is the Whole Body MR Imaging Necessary in the Management of Children with Acute Myeloid Leukemia?

Wednesday, Dec. 2 9:20AM - 9:30AM Location: S102AB

Participants
Hee Mang Yoon, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Jin Seong Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ah Young Jung, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Young Ah Cho, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

Chong Hyun Yoon, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Whole body MR imaging has been frequently used for the management of children with acute myeloid leukemia (AML) because it can provide additional information besides bone marrow evaluation. In this regard, we assess the use of the whole body magnetic resonance (MR) imaging in the management of the children with AML to validate its usefulness.

METHOD AND MATERIALS

Sixty nine whole body MR scans of 40 consecutive pediatric patients with AML were evaluated by two radiologists in consensus. Whole body MR imaging was acquired for the following purposes: work-up for initial diagnosis, work-up for relapsed AML, work-up for stem cell transplant, work-up for a new sign or symptom, or follow-up of pre-existing abnormality. We estimated the presence of abnormal findings including extramedullary granulocytic sarcoma (EGS), clinically occult lesions, and lesions explaining the patient's clinical symptoms, except the bone marrow involvement by AML.

RESULTS

Total 76 EGSs were identified in eleven of 40 patients (27.5 %). Nine of eleven patients (81.8%) had multiple EGSs. Thirty eight EGSs were incidentally detected on 9 whole body MR scans in seven patients (17.5 %). Positive findings were most commonly observed on whole body MR scans performed as work-up for a new sign or symptom (14 of 15 MR scans, 93.3%). Six clinically occult non-EGS lesions found on whole body MR scans were small intracranial hemorrhage (n=1), bilateral otomastoiditis (n=1), pneumonia (n=1), knee joint inflammation with effusion (n=1) and disseminated infection/inflammation (n=2). Multiple lesions at anatomically distant regions were successfully evaluated with 18 whole body MR scans (26.1%) in a single session head-to-toe imaging.

CONCLUSION

Whole body MR imaging could be helpful to detect multiple EGSs or clinically occult lesions and be used as a problem solving tool in children with a new sign or symptom by AML in a single session study.

CLINICAL RELEVANCE/APPLICATION

Whole body MR imaging is a useful imaging modality in management of the pediatric AML patients considering tendency for multiplicity of EGSs and prevalent occult lesions as well as the intrinsic advantages of whole body MR imaging.

RC513-06 Defining Optimal Dose Regimes for Pediatric Whole-body 18F-FDG-PET/MRI

Wednesday, Dec. 2 9:30AM - 9:40AM Location: S102AB

Participants
Sergios Gatidis, MD, Tubingen, Germany (*Presenter*) Nothing to Disclose
Holger Schmidt, PhD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Christian la Fougere, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Konstantin Nikolaou, MD, Tuebingen, Germany (*Abstract Co-Author*) Speakers Bureau, Siemens AG Speakers Bureau, Bracco Group Speakers Bureau, Bayer AG
Nina Schwenzer, MD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Juergen F. Schaefer, MD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To find optimal tracer dose regimes for pediatric whole-body 18F-FDG PET/MRI with minimal radiation exposure and sufficient diagnostic quality.

METHOD AND MATERIALS

Whole-body PET data sets of 30 pediatric patients (14 female, mean age 12±6 [1-18] years) were retrospectively analyzed. PET data were acquired in list mode on a combined PET/MR scanner (Biograph mMR, Siemens) 65±14 min after injection of 3.1±0.5 MBq 18F-FDG per kg bw for 4 min per bed position.Based on the acquired list mode data, PET images of lower tracer doses (0.25 to 2.5 MBq/kg bw 18F-FDG) were simulated by retrospective undersampling of PET list mode data.Resulting data sets were analyzed quantitatively by measurement of standardized uptake values (SUVs) in healthy organs (liver, lungs, blood pool) and pathologic lesions by volume-of-interest (VOI) analysis.Qualitative analysis was performed independently by two readers experienced in pediatric nuclear medicine. To this end, PET-data sets were analyzed beginning with the lowest simulated tracer dose (0.25 MBq/kg bw) and gradually increasing tracer doses up to the original acquired PET image. Conspicuity of organ structures (such as brain, thymus, muscle, heart etc.) and detectability of focal PET lesions were recorded and finally compared to the original full-dose data set.

RESULTS

Image quality steadily improved with increasing simulated tracer doses. SUVs showed higher relative deviations of about 10 % at tracer doses below 1 MBq/kg bw. Conspicuity of physiologic organ structures improved steadily with increasing simuloatead tracer doses and was equivalent with the original acquired PET data set at simulated doses of 1-1.5 MBq/kg bw. Detectability of focal PET lesions increased continuously with increasing simultated tracer doses; all focal lesion that were detectable in the original full-dose PET were already detectable at 1.5 MBq/kg bw.

CONCLUSION

Tracer doses can be significantly reduced in pediatric PET/MRI compared to existing standard regimes. Our results suggest that doses of 1.5 MBq/kg bw FDG are sufficient for accurate diagnostic quality of PET. These results have to be validated in larger clinical studies.

CLINICAL RELEVANCE/APPLICATION

Reduced tracer doses will result in lower diagnostic radiation exposure in pediatric patients. Variation of PET acquisition times may enable further reduction of tracer doses.

RC513-07 PET/MR Compared to PET/CT in the Assessment of Pediatric Histiocytoses

Wednesday, Dec. 2 9:40AM - 9:50AM Location: S102AB

Participants
Andrew Sher, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Danial S. Bokhari, MD, Houston, TX (*Presenter*) Nothing to Disclose
Matthew Goette, PhD, Houston, TX (*Abstract Co-Author*) Support, Koninklijke Philips NV
Rajesh Krishnamurthy, MD, Houston, TX (*Abstract Co-Author*) Research support, Koninklijke Philips NV; Research support, Toshiba Corporation
Victor J. Seghers, MD, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Compare lesion based analysis of 18F-FDG PET/MR to 18F-FDG PET/CT in pediatric Langerhans Cell Histiocytosis (LCH) and Rosai Dorfman Disease (RD).

METHOD AND MATERIALS

This prospective, HIPAA compliant study had IRB approval. Following written informed consent 18 18F-FDG PET/CT and PET/MR examinations were performed on 9 patients (6 male, 3 female, mean age 6; range: 7 months to 16 years) following a single-injection dual-imaging protocol. The indication was LCH in 11 exams and RD in 7 exams. Two readers blinded to clinical history assessed the anonymized data for metabolically active disease by consensus read. PET/CT and PET/MR were viewed simultaneously and volumes of interest were drawn over lesions, with lesions defined as non-physiologic uptake above background. SUV maximum values were recorded. Lesion detection rates and classification agreement between modalities were analyzed and compared to the reference standard (all available examinations and clinical history).

RESULTS

94 metabolically active lesions were identified on PET/MR versus 100 on PET/CT. Of the 94 lesions identified on both exams there was concordant classification in 93 (99%), representing excellent agreement, $\kappa = .97$ ($p < .001$), 95% CI (0.94-1.0). 6 lesions were identified on PET/CT but not PET/MR, 3 were foci of active disease, 1 was an inflammatory lymph node, and 2 were artifactual or physiologic. Per the standard of reference, 101 metabolically active lesions were available for analysis (80 were active disease while 21 were benign). Compared to the reference standard, the overall sensitivity (93% vs. 96%, $p>.05$) and specificity (100% vs. 95%, $p > .05$) of PET/MR vs. PET/CT, respectively, demonstrated no significant difference. The accuracies of PET/MR and PET/CT measured 94% and 96%, respectively. SUV analysis demonstrated lesions on PET/MR measuring 11% lower on average than PET/CT ($p<.001$). There was a strong correlation ($\rho = .76$) between the SUVs of the two modalities.

CONCLUSION

PET/MR demonstrates no statistical difference to PET/CT for lesion detection and classification in patients with LCH or RD. PET/MR imaging is a promising lower-radiation alternative to PET/CT for this patient population.

CLINICAL RELEVANCE/APPLICATION

PET/MR evaluation for pediatric histiocytoses demonstrates no statistical difference in sensitivity, specificity, or accuracy of lesion detection compared to PET/CT and can contribute to patient management with lower radiation dose.

RC513-08 Whole Body Imaging in Pediatric Oncology

Wednesday, Dec. 2 9:50AM - 10:10AM Location: S102AB

Participants
Stephan D. Voss, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant should understand the various whole body multi-modality imaging techniques used in Pediatric Oncology2) The participant should be able to discuss strategies and opportunities for radiation dose reduction when performing multi-modality whole body examinations3) The audience should understand the appropriate indications for whole body imaging in pediatric oncology, including the role of whole body imaging in tumor surveillance and evaluation of patients with cancer predisposition syndromes.

ABSTRACT

RC513-09 Neuroblastoma - Imaging and Therapy Update

Wednesday, Dec. 2 10:30AM - 10:50AM Location: S102AB

Participants
Adina L. Alazraki, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the common indications for I-131 MIBG in pediatric patients. 2) Describe the necessary considerations for pediatric patients prior to I-131 MIBG therapy. 3) Discuss imaging protocols and typical pre and post therapy imaging appearance as part of monitoring of response to therapy.

RC513-10 PET/MR Imaging in Pediatric Sarcomas and Malignant Soft Tissue Tumors: Is There a Clinical Impact?

Wednesday, Dec. 2 10:50AM - 11:00AM Location: S102AB

Participants
Juergen F. Schaefer, MD, Tuebingen, Germany (*Presenter*) Nothing to Disclose
Sergios Gatidis, MD, Tubingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Ilias Tsiflikas, MD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Guido Seitz, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose

Martin Ebinger, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Christian la Fougere, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Matthias Reimold, MD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Nina Schwenzer, MD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Konstantin Nikolaou, MD, Tuebingen, Germany (*Abstract Co-Author*) Speakers Bureau, Siemens AG Speakers Bureau, Bracco Group Speakers Bureau, Bayer AG

PURPOSE

To evaluate the clinical impact of PET/MRI in pediatric sarcomas and malignant soft tissue tumors.

METHOD AND MATERIALS

43 examinations in 30 patients (11 female, mean age 11.1 y ± 5.4 y) with diagnoses of Ewing sarcoma (n=6), osteosarcoma (n=4), rhabdomyosarcoma (n=6), NF 1 suspected for MPNST (n=9), others (n=5) were included. Written informed consent was obtained. Two protocols were performed: In group A, 11 examinations were carried out using PET/CT (Biograph mCT, Siemens) and PET/MRI (Biograph mMR, Siemens). Data were acquired on the same day after administration of 161±88 MBq 18F-FDG. In group B, 32 examinations were performed using PET/MRI only, after administration of 114±67 MBq 18F-FDG. Additionally, if indicated an additional low dose chest CT was carried out. In Group A, image analysis was performed by two experienced rater teams blinded for the respective different modality. In group B, image analysis was performed by an experienced rater team: first MRI followed by PET-MRI. Histopathology and follow-up served as reference standard. Findings of PET/MRI were reevaluated by the institutional pediatric tumorboard regarding further clinical management (e.g. change of diagnostic or therapeutic regime).

RESULTS

Group A: The rate of focal uptake on PET/MRI was equivalent to PET/CT (52 vs. 53). Local staging (4/11), anatomic allocation (2/11) and relevant additional findings were improved by MRI. Group B: Findings of PET/MRI affecting clinical management were found in 8 /32 examinations (e.g. change of surgical approach or no additional radiation). Compared to chest CT, PET/MRI detected equal numbers of metastases in 5 patients and lower numbers in 5 patients. MRI was negative in 4 patients with nodules smaller than 4 mm who had no evidence of metastases in follow-up. There was no evidence of pulmonary metastasis in 16 patients.

CONCLUSION

Simultaneous PET/MRI in pediatric sarcomas allows a comprehensive diagnostic for both, local and systemic tumor spread. PET/MR substantially affected the clinical management. The lower detection rate of small pulmonary nodules by MRI needs to be discussed with respect to clinical importance.

CLINICAL RELEVANCE/APPLICATION

PET/MRI improves the clinical management in pediatric soft tissue tumors and both, local and systemic staging is possible in a single approach.

RC513-11 Brain Exams in Pediatric Epilepsy: PET/MRI Compared to PET/CT

Wednesday, Dec. 2 11:00AM - 11:10AM Location: S102AB

Participants
Matthew Goette, PhD, Houston, TX (*Presenter*) Support, Koninklijke Philips NV
Erica Yang, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Nadia F. Mahmood, MD, Sugar Land, TX (*Abstract Co-Author*) Nothing to Disclose
Jeremy Y. Jones, MD, Bellaire, TX (*Abstract Co-Author*) Nothing to Disclose
Wei Zhang, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Victor J. Seghers, MD, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Andrew Sher, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Michael J. Paldino, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

PET/MR offers the potential for diverse image contrasts in a single examination. To reach its full potential, this technology will require robust attenuation correction (AC) algorithms. The goal of this study was to compare the diagnostic accuracy of FDG-PET images of the brain processed according to MR-based AC (MRAC) with that of images obtained using traditional CT-based AC (CTAC).

METHOD AND MATERIALS

IRB approval and informed consent were obtained for this study. All patients referred for clinical FDG-PET/CT exams of the brain were prospectively recruited to undergo an additional FDG-PET acquisition on a Philips Ingenuity PET/MR system. A bootstrap power calculation was used to determine the number of patients required to detect a 10% difference in diagnostic accuracy (power: 0.8). Raw FDG-PET images were processed according to vendor-provided MRAC or CTAC algorithms. Five expert readers were blinded to the method of AC and all other clinical/imaging data. Consensus between readers at unblinded re-review of all data was considered the gold standard. Any potential difference in the accuracy of PET/MR compared to PET/CT was assessed using McNemar's test. Cohen's kappa was calculated to measure agreement between each reader's interpretation of MRAC and CTAC.

RESULTS

The study population comprised 35 patients referred for a diagnosis of epilepsy (mean age: 11y; range: 2-18y), with a paired PET/CT and PET/MR exam. Compared to the reference gold standard, the overall sensitivity (71.6% and 70.2%, p>0.05) and specificity (74.7% and 85.1%, p>0.05) of the blinded interpretation of the PET/MR and PET/CT images, respectively, demonstrated no significant difference. The accuracy of MRAC-processed images did not differ significantly from those obtained using CTAC (74.7% and 76.6%, respectively, p>0.3). Overall, there was good intra-reader agreement between the interpretation of PET/MR and PET/CT (κ range: 0.55-0.78).

CONCLUSION

The accuracy of FDG-PET images generated by an MRAC algorithm was comparable to that of FDG-PET images processed by traditional CTAC. These results further support the use of integrated PET/MR systems in clinical practice.

CLINICAL RELEVANCE/APPLICATION

The evaluation of pediatric brain exams for the diagnosis of epilepsy using PET/MR demonstrated no statistical difference in sensitivity, specificity, or accuracy compared to PET/CT, and support the use of PET/MR in patient management with lower radiation dose.

RC513-12 What is the Optimal Way to Measure Neuroblastoma Response to Chemotherapy?

Wednesday, Dec. 2 11:10AM - 11:20AM Location: S102AB

Participants
Lindsey R. Klingbeil, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose
Andrew T. Trout, MD, Cincinnati, OH (*Abstract Co-Author*) Advisory Board, Koninklijke Philips NV
Alex Towbin, MD, Cincinnati, OH (*Abstract Co-Author*) Author, Reed Elsevier; Consultant, Reed Elsevier; Shareholder, Merge Healthcare Incorporated; Consultant, Guerbet SA; Grant, Guerbet SA
Daniel von Allmen, MD, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The current recommendation for determining primary neuroblastoma tumor size and response to chemotherapy is to use 3D (anteroposterior, transverse, craniocaudal) measurements. This is in contrast to the 1D measurements recommended in RECIST 1.1 and the 2D measurements recommended for Hodgkin lymphoma. There is little evidence specific to neuroblastoma to show superiority of one measurement technique. The purpose of this study was to assess the correlation between the various measurement methods and actual tumor volume in terms of response assessment.

METHOD AND MATERIALS

We retrospectively analyzed the radiographic data of intermediate and high-risk neuroblastoma patients with either Stage 3 or 4 disease who were diagnosed between 2003 and 2012. Primary tumors were measured in 1D, 2D and 3D at the time of diagnosis and following chemotherapy with 2D and 3D measurements expressed as a product. True tumor volume at each time point was also measured by manual segmentation of the tumor. Tumor response for each measurement method was expressed in terms of a fraction of tumor size at diagnosis. Comparisons were based on Bland-Altman analyses with agreement expressed in terms of correlation coefficients.

RESULTS

Imaging from 34 patients was included in the study with comparison of tumor response to true volumes for 50 1D, 50 2D, and 39 3D measurements. A statistically significant correlation was seen between both the 2D ($p<0.05$) and the 3D ($p<0.01$) measurements and the volumetric method of tumor response assessments with the best correlation ($r=0.47$ versus 0.31) for the 3D measurements. 1D measurements had poor correlation with the volumetric response assessment ($r=0.04$). The mean difference in tumor response relative to volumetric assessment was higher for 2D measurements than 3D measurements (19% ±16% versus 10%±15%).

CONCLUSION

Correlation between single and multiplanar measurements and true tumor volume for assessment of neuroblastoma response to therapy is moderate at best likely reflecting the irregular shape and infiltrative character of these tumors. 3D measurements had the highest correlation with volumetric assessments but may over- or underestimate tumor response by 40%.

CLINICAL RELEVANCE/APPLICATION

Accurately determining the primary tumor response to chemotherapy using imaging is critical for making therapeutic decisions and surgical planning for neuroblastoma patients.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Alex Towbin, MD - 2014 Honored Educator

RC513-13 Evaluation of the Predictive Value of Doppler Ultrasonography in Children with Clinically Suspicious Hepatic Veno-occlusive Disease after Hematopoietic Stem Cell Transplantation

Wednesday, Dec. 2 11:20AM - 11:30AM Location: S102AB

Participants
Ji-Eun Park, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Young Hun Choi, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyun Suk Cho, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yu Jin Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jung-Eun Cheon, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Woo Sun Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
In-One Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the predictive value of Doppler ultrasonography in children with clinically suspicious hepatic veno-occlusive disease (VOD) after hematopoietic stem cell transplantation (HSCT).

METHOD AND MATERIALS

From January 2012 to January 2015, among 216 children who underwent HSCT, 56 children underwent Doppler ultrasonography for clinical suspicion of hepatic VOD (M:F = 22:34; mean age, 8.3years; age range 8months-20years). Among 56 patients, fifteen patients were confirmed as having VOD later (VOD group), while 41 patients turned out to have other conditions (acute graft-

versus-host disease, n=10; cytomegalovirus hepatitis, n=4; other virus hepatitis, n=6; aspergilosis, n=3; unrevealed cause, n=18; non-VOD group). Doppler ultrasonography was retrospectively reviewed for the following findings: hepatomegaly, splenomegaly, gall bladder(GB) wall edema, ascites, Doppler spectral parameters of the left portal vein (peak velocity, trough velocity, pulsatile index, flow inversion), Doppler spectral parameters of the left hepatic artery (peak systolic velocity, end systolic velocity, resistance index) and phasicity of the middle hepatic vein. The Doppler US findings were compared between two groups using Student t-test, Chi square test. Multivariate logistic regression was performed to reveal the significant predictor of VOD.

RESULTS

The VOD group showed significantly higher incidences of hepatomegaly (9/15, 60% vs. 10/41, 24%, p=0.016), GB wall edema (9/12, 80% vs. 9/41, 22%, p < 0.001) and ascites (12/15, 80% vs. 9/41, 22%, p < 0.001), relative to the non-VOD group. The peak systolic velocity of the left hepatic artery was significantly higher in VOD patients compared with non-VOD patients (73±33cm/sec vs. 49±21cm/sec, p=0.002). Other findings showed no statistically significant difference between the two groups. Multivariate analysis revealed that only ascites was significantly associated with VOD (ß=0.345).

CONCLUSION

The presence of hepatomegaly, GB wall edema, ascites and increased peak systolic velocity of the hepatic artery were significantly associated with progression to definite VOD in pediatric HSCT patients with clinically suspicious VOD.

CLINICAL RELEVANCE/APPLICATION

Hepatic VOD is one of the most feared complications of HSCT. Our study identified Doppler ultrasonographic findings that could be helpful in predicting progression to definite VOD.

RC513-14 Correlation between Diffusion-weighted Imaging Combined with Conventional Magnetic Resonance Imaging Parameters and Histopathologic Findings in Eyes Primarily Enucleated for Advanced Retinoblastoma: A Retrospective Study

Wednesday, Dec. 2 11:30AM - 11:40AM Location: S102AB

Awards
Trainee Research Prize - Medical Student

Participants
Yanfen Cui, Shanghai, China (*Presenter*) Nothing to Disclose
Dengbin Wang, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Huanhuan Liu, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Caiyuan Zhang, MD, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

to evaluate the diagnostic accuracy of conventional MR imaging in detecting tumor invasion of intraocular retinoblastoma and to correlate ADC values with high-risk pathological prognostic parameters of retinoblastoma.

METHOD AND MATERIALS

The accuracy of MR imaging in detecting invasion extent of 63 tumors were determined. Furthermore, ADC value with b factors of 0 and 1000 seconds/mm2 were calculated and correlated with high risk pathological prognostic parameters. Additionally, the correlation of Ki-67 expression with ADC value were analysed.

RESULTS

The accuracy of conventional MRI in detecting prelaminar and postlaminar optic nerve invasion was 85.7% , focal and massive choroidal invasion 61.9%, scleral invasion 98.4% and ciliary body invasion was 95.2%. The ADC value of well-differentiated retinoblastoma were significantly different from poorly or undifferentiated tumors (p < 0.002). There was no significant difference in the ADC value between bilateral and unilateral retinoblastomas (P=0.09) and different growth pattern (P=0.74). The ADC value of postlaminar optic nerve invasion has significantly different with no optic nerve invasion (P=0.04). There was significant difference in the ADC of retinoblastoma with or without scleral invasion (P=0.007), but has no difference in chorodial invasion (P=0.629) or ciliary body invasion (P=0.532). Additionally, the ki-67 index was inversely correlated with the ADC value (p < 0.002).

CONCLUSION

Routine MRI has limitations in reliably predicting microscopic infiltration of the retinoblastoma, where ADC correlated well with high-risk pathological prognostic parameters and Ki-67 index for retinoblastoma and may serve as a noninvasive prognostic parameter for assessment of newly diagnosed retinoblastoma.

CLINICAL RELEVANCE/APPLICATION

Routine MRI has limitations in reliably predicting microscopic infiltration of the retinoblastoma, whereas ADC correlated well with high-risk pathological prognostic parameters and Ki-67 index for retinoblastoma and may serve as a noninvasive prognostic parameter for assessment of newly diagnosed retinoblastoma.

RC513-15 Imaging of Tumor Syndromes

Wednesday, Dec. 2 11:40AM - 12:00PM Location: S102AB

Participants
Andrew T. Trout, MD, Cincinnati, OH, (andrew.trout@cchmc.org) (*Presenter*) Advisory Board, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Recognize some of the tumor predisposition syndromes that present in children/young adults. 2) Name the relevant tumors for the discussed syndromes. 3) Implement currently accepted imaging protocols for the discussed syndromes.

ABSTRACT

RC514

Interventional Series: Peripheral and Visceral Occlusive Disease

Wednesday, Dec. 2 8:30AM - 12:00PM Location: E353A

VA IR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Parag J. Patel, MD, Milwaukee, WI (*Moderator*) Consultant, Medtronic, Inc; Consultant, C. R. Bard, Inc; Consultant, Penumbra, Inc; Jonathan M. Lorenz, MD, Chicago, IL (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe pros and cons of intervention for median arcuate ligament compression on the celiac axis. 2) Explain the use of radial artery access. 3) Outline 3 recommendations for endovascular treatment of peripheral vascular disease. 4) Describe current status of true percutaneous endovascular repair of abdominal aortic aneurysms. 5) Describe 2 vascular compression syndromes.

Sub-Events

RC514-01 Radial Artery Access. Why? When? How?

Wednesday, Dec. 2 8:30AM - 9:00AM Location: E353A

Participants
Marcelo Guimaraes, Charleston, SC (*Presenter*) Consultant, Cook Group Incorporated ; Consultant, Baylis Medical Company; Consultant, Terumo Corporation; Patent holder, Cook Group Incorporated

LEARNING OBJECTIVES

View learning objectives under main course title.

RC514-03 Morphological Predictors of Optimal Recanalization Strategy for Long-segment Chronic Total Occlusions of the Femoropopliteal Arteries

Wednesday, Dec. 2 9:10AM - 9:20AM Location: E353A

Participants
Jungong Zhao, MD, Shanghai, China (*Presenter*) Nothing to Disclose

PURPOSE

To investigate the morphological characteristics of long-segment chronic total occlusions of the femoropopliteal arteries (LFP-CTOs) as predictors of the optimal recanalization strategy.

METHOD AND MATERIALS

We retrospectively evaluated the morphological characteristics of 102 CTOs (74 patients) treated with antegrade and/or retrograde recanalization using contrast enhanced-magnetic resonance / computed tomography angiography and digital subtraction angiography imaging results. Proximal morphology, lesion length, calcification, proximal branching, collateral circulation, runoff vessels, and concomitant arterial occlusion were used as predictors for univariate analysis. Multivariate logistic regression analysis was performed to identify independent predictors of successful angioplasty and recanalization.

RESULTS

Antegrade and retrograde recanalization were successful in 82 and 10 CTOs, respectively (total success rate, 90.2%). The antegrade approach was frequently used for wire crossing and had a shorter mean procedure time than the retrograde approach (90.7 ± 35.3 min vs. 185.5 ± 41.2 min, $P < 0.001$). Multivariate analysis revealed that concomitant artery occlusion [odds ratio (OR): 0.299; 95% confidence interval (CI): 0.103-0.868; P=0.026) was a lower likelihood technical success; flush occlusion (OR: 41.795; 95% CI: 4.567-382.517; P<0.001) and large collateral (OR: 14.829; 95% CI: 1.350-162.898; P=0.027) were predictors of retrograde recanalization. During follow-up, sustained ABI improvement was founded in 79.3% limbs, and the binary restenosis rate was 40.2% in antegrade group and 50.0% in retrograde group ($P > 0.05$), but the flush occlusion (OR: 3.736; 95% CI: 1.152 - 12.119; P=0.028) was associated with a significantly higher likelihood of binary restenosis.

CONCLUSION

We recommend that LFP-CTOs with concomitant occlusion should be treated with bypass surgery, whereas flush occlusions and those with large collateral circulation should be managed with retrograde recanalization earlier if antegrade approach fails.

CLINICAL RELEVANCE/APPLICATION

Morphological characteristics of long-segment chronic total occlusions of femoropopliteal arteries can help predict the optimal strategy for endovascular recanalization.

RC514-04 Trends in Use of Vascular Ultrasound and Noninvasive Physiologic Testing for Peripheral Arterial Disease: Are These Tests Being Overused?

Wednesday, Dec. 2 9:20AM - 9:30AM Location: E353A

Participants
David C. Levin, MD, Philadelphia, PA (*Presenter*) Consultant, HealthHelp, LLC; Board of Directors, Outpatient Imaging Affiliates, LLC

Laurence Parker, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Geoffrey A. Gardiner JR, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Vijay M. Rao, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The U.S Preventive Services Task force has never supported routine screening for peripheral arterial disease (PAD). There is no need to treat asymptomatic (or even many symptomatic) patients and studies suggest only very modest recent growth in PAD incidence. For these reasons, our goal was to assess recent trends in the use of ultrasound (US) and noninvasive physiologic tests (NPTs), the most common tests used to screen for and initially diagnose PAD.

METHOD AND MATERIALS

The nationwide Medicare Part B databases for 2001 through 2013 were used. The 2 CPT codes for extremity arterial US and the 3 codes for extremity NPTs were selected. Procedure volume trends were evaluated. Medicare's physician specialty codes were used to determine which specialists were doing the studies. Utilization rates per 1000 were calculated.

RESULTS

Total Medicare volume of extremity arterial US was 396,734 in 2001, increasing every year thereafter to 818,272 in 2013 (+106%). The US utilization rate per 1000 was 11.7 in 2001, rising to 21.9 in 2013 (+87%). NPT volume increased from 716,005 in 2001 to a peak of 1,362,789 in 2010, then dropped to 1,278,145 in 2013 (+79% vs 2001)). The NPT rate per 1000 increased from 21.0 to a peak of 38.7 in 2010, then dropped to 34.3 in 2013 (+63% vs 2001). The 3 highest volume specialties in arterial US in 2013 were surgery (258,104 - up 108% vs 2001), radiology (210,477 - up 93% vs 2001) and cardiology (187,275 - up 267% vs 2001). The 3 highest volume specialties in NPTs in 2013 were surgery (444,623 - up 35% vs 2001), cardiology (267,005 - up 206% vs 2001), and primary care (229,215 - up 208% vs 2001). The overall rate of use of these 2 major kinds of tests for PAD increased from 32.7 per 1000 in 2001 to 56.2 in 2013 (+72%).

CONCLUSION

Use of both US and NPTs for possible PAD grew rapidly from 2001 to 2013. Growth was especially high among surgeons and cardiologists. There is no apparent medical rationale for the increasing utilization of these tests for PAD. The rapid growth in use of both US and NPTs raises concern about overuse, especially given the fact that surgeons and cardiologists are in a position to self-refer.

CLINICAL RELEVANCE/APPLICATION

n/a

RC514-05 Update on Recommendations for Endovascular Treatment of PVD in 2015-This Is What to Do and Why to Do It

Wednesday, Dec. 2 9:30AM - 10:00AM Location: E353A

Participants
Martin A. Funovics, MD, Vienna, Austria (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC514-06 EVAR: True Percutaneous Devices? When?

Wednesday, Dec. 2 10:00AM - 10:30AM Location: E353A

Participants
Parag J. Patel, MD, Milwaukee, WI (*Presenter*) Consultant, Medtronic, Inc; Consultant, C. R. Bard, Inc; Consultant, Penumbra, Inc;

LEARNING OBJECTIVES

View learning objectives under main course title.

RC514-07 Automated Quantification of Muscle Perfusion Using contrast Enhanced Ultrasound: Initial in Vitro and in Vivo Evaluation of Lower Limb Perfusion

Wednesday, Dec. 2 10:30AM - 10:40AM Location: E353A

Participants
Wing Keung t. Cheung, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Katherine t. Williams, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Kirsten t. Chrstensen-Jeffries, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Brahman Dharmarajah, MBBS, MRCS, London, United Kingdom (*Presenter*) Nothing to Disclose
Robert J. Eckersley, PhD, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Alun Davies, FRCR, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Mengxing Tang, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

An accurate and automated technique for quantification of tissue microperfusion is desirable for a wide-range of clinical applications including atherosclerotic and diabetic peripheral vascular disease. Existing studies evaluating peripheral vascular disease still use qualitative visual assessment and studies quantifying contrast ultrasound signals have limited outcomes.In this study, we develop a pixel-based automated bubble detection algorithm capable of separating contrast signals from both tissue signal and noise thus generating a quantitative surrogate measure of muscle blood flow.

METHOD AND MATERIALS

Quantification of contrast signal at varying dilutions of microbubble was performed within an in-vitro phantom to develop the

automated bubble detection algorithm. After ethical approval and informed consent, the in-vivo study evaluated muscle perfusion of the right calf before and after physical exercise in 5 healthy volunteers. Imaging was acquired using a Phillips iU-22 ultrasound platform with a L9-3 linear probe. Offline blinded image analysis was performed using an average of 5 regions of interest placed over the muscle bulk. Surface area ratio of bubble pixel intensity to background signal was calculated as a surrogate of muscle microperfusion which was compared before and after exercise.

RESULTS

The In vitro study demonstrated a good agreement between known bubble concentrations and quantification measures generated by the algorithm (R=0.94). For in vivo data the quantification results were calculated usng the algorithm and compared before and after subject exercise. Initial analysis showed that the average blood volume in the calf muscle increased by 48% after exercise (P<0.004).

CONCLUSION

The automated bubble detection algoritm has shown to be a promising tool for detecting and quantifying microbubble signals representing muscle microperfusion both in vitro and in vivo.

CLINICAL RELEVANCE/APPLICATION

Contrast enhanced ultrsound may provide a novel imaging technique for assessment of lower limb muscle microperfusion. This novel imaging biomarker may provide valuable information in diagnosis and treatment response in lower limb peripheral vascular disease.

RC514-08 Twins Study: Role of Femoral Ultrasound Examination in Predicting Cardiovascular Risk

Wednesday, Dec. 2 10:40AM - 10:50AM Location: E353A

Participants
Pierleone Lucatelli, MD, Roma, Italy (*Abstract Co-Author*) Nothing to Disclose
Carlo Cirelli, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Renato Argiro, Rome, Italy (*Presenter*) Nothing to Disclose
Beatrice Sacconi, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Riccardo Rosati, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Fabrizio Fanelli, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Carlo Catalano, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Compare Common-Femoral-Artery (CFA) and Common-Carotid-Artery (CCA) Echo-Color-Doppler examination in predicting the cardiovascular risk in a sample of apparently healthy twins recruited from the Italian Twin Registry.

METHOD AND MATERIALS

The multicenter study included 322 twins (59.9% female) aged 20-78 years (52.1±15.3). Subjects underwent Echo-Color-Doppler examination of CCA and CFA. Mean IMT in both right and left sides of the CCA or CFA was recorded. Mean values were compared by Student's t test for paired data and by robust regression model to take account of the dependence of twin data within pairs and of confounders (age and gender). Plaques (thickening ≥1.5 mm over IMT) prevalence and composition (calcific, fibro-lipidic, mixed) in the two regions were estimated and compared by chi-squared test or logistic regression for clustered observation.

RESULTS

A significant difference (P<0.01) between mean CCA-IMT and mean CFA-IMT was detected (0.70±0.20 vs 0.73±0.24mm), although mean difference between the two traits was relatively small (0.03±0.17mm). Plaque prevalence was significantly higher in CFA compared to CCA (40.7% vs 30.4%). This result was confirmed even when only lipid plaque(33.6% in CCA and 24.5% in CFA) was considered and when age and gender were incorporated in the analysis. Isolated plaque prevalence was 18.3% for CCA and 8.1% for CFA. 51.2% of the sample had at least a plaque in both traits.

CONCLUSION

Echo-Color-Doppler identifies more plaques in CFA than in CCA, with prevalent fibro-lipidid composition. Femoral Echo-Color-Doppler should be introduced as part of screening protocols in order to assess the cardiovascular risk.

CLINICAL RELEVANCE/APPLICATION

Echo-Color-Doppler identifies more plaques in CFA than in CCA therefore Femoral Echo-Color-Doppler should be introduced as part of screening protocols in order to assess the cardiovascular risk.

RC514-09 Ultrasound Assessment of the Posterior Circumflex Humeral Artery in Elite Volleyball Players: Aneurysm Prevalence, Anatomy, Branching Pattern and Vessel Characteristics

Wednesday, Dec. 2 10:50AM - 11:00AM Location: E353A

Participants
Daan van de Pol, MD, Amsterdam, Netherlands (*Presenter*) Nothing to Disclose
Mario Maas, MD, PhD, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Aart Terpstra, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Marja Pannekoek-Hekman, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Paul Kuijer, PhD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
R. Nils Planken, MD,PhD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Elite overhead athletes, like volleyball players, are at risk of finger ischemia due to arterial emboli originating from an injured and degenerated proximal posterior circumflex humeral artery (PCHA) in the dominant shoulder. Ultrasound (US) is the first line imaging modality for assessment of the PCHA in symptomatic athletes. However, identification and assessment of the PCHA is cumbersome in the hands of inexperienced ultrasonographists, partially due to anatomical variations and the nearby originating and resembling

deep brachial artery (DBA). The purpose of this study is (1) to determine the prevalence of PCHA aneurysms in elite volleyball players and (2) to describe PCHA and DBA characteristics that can be used for accurate identification and assessment of the PCHA.

METHOD AND MATERIALS

From January 2014 until July 2014, two experienced ultrasonographists completed the standardized PCHA US-protocol in 286 elite volleyball players. Assessment included determination of PCHA aneurysms (defined as segmental vessel dilatation ≥150%), anatomy/branching pattern, and PCHA and DBA vessel characteristics: course and diameter.

RESULTS

The PCHA was identified in 100% of volleyball players (n=286) and the DBA in 96% (n=276). An aneurysm of the PCHA was detected in 4.1% of the volleyball players (n=12) with a mean diameter of 5.9mm ±1.7 and was significantly larger compared to non-dilated PCHA vessel segments ($p<0.01$). The mean non-dilated PCHA and DBA diameters were 3.8mm ±0.5 (95%CI 3.7-3.8) and 2.3mm ±0.5 (95%CI 2.2-2.3), respectively. The PCHA originated directly from the axillary artery in 82% (n=235) and the DBA in 70% (n=200). PCHA anatomical variations included a common trunk with the DBA (n=24), common trunk with a different artery than the DBA (n=21) and a common trunk with two other arteries (n=3). The PCHA showed a tortuous course towards the humerus in 100% of the cases. The DBA showed a straight course parallel to the axillary artery in 100% of the cases.

CONCLUSION

The prevalence of PCHA aneurysms was 4.1% in our study cohort of 286 elite volleyball players. The reported PCHA and DBA vessel characteristics provide clear guidance for identification and assessment of the PCHA.

CLINICAL RELEVANCE/APPLICATION

One in twenty-five elite volleyball players showed a PCHA aneurysm on ultrasound. We provide PCHA characteristics and diameters that can be used as reference values (normal vs. aneurysmatic) for clinical assessment and research.

RC514-10 Compressive Vascular Syndromes

Wednesday, Dec. 2 11:00AM - 11:30AM Location: E353A

Participants
Lindsay S. Machan, MD, Vancouver, BC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC514-11 Median Arcuate Ligament Syndrome

Wednesday, Dec. 2 11:30AM - 12:00PM Location: E353A

Participants
Jonathan M. Lorenz, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objecitves under main course title.

RC515

Breast Imaging: Politics and Practice

Wednesday, Dec. 2 8:30AM - 10:00AM Location: E450A

BR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

1) To understand the basis for the evidence supporting screening mammography as it is currently practiced in the US, and how changes to that paradigm based on risk or density lack the same level of rigorous scientific support. 2) To understand the issue of overdiagnosis of breast cancer through screening and why the estimates of the rate of this phenomenon vary so widely and how we might actually resolve this controversy. 3) To understand why the study of screening for breast cancer in high risk women with MRI and US is not readily generalizable to average risk women and the risks we take if we do apply these technologies more broadly.

Sub-Events

RC515A Current Controversies

Participants
Etta D. Pisano, MD, Charleston, SC (*Presenter*) Founder, NextRay, Inc CEO, NextRay, Inc Research Grant, Koning Corporation Research Grant, Koninklijke Philips NV Research Grant, Zumatek, Inc Research Grant, FUJIFILM Holdings Corporation Equipment support, Siemens AG Research Grant, Siemens AG Equipment support, Koninklijke Philips NV Research Grant, Koninklijke Philips NV

LEARNING OBJECTIVES

1) To understand the basis for the evidence supporting screening mammography as it is currently practiced in the US, and how changes to that paradigm based on risk or density lack the same level of rigorous scientific support. 2) To understand the issue of overdiagnosis of breast cancer through screening and why the estimates of the rate of this phenomenon vary so widely and how we might actually resolve this controversy. 3) To understand why the study of screening for breast cancer in high risk women with MRI and US is not readily generalizable to average risk women and the risks we take if we do apply these technologies more broadly.

RC515B Economic Challenges

Participants
Geraldine B. McGinty, MD,MBA, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the funfdamentals of healthcare payment policy as they impact breast imaging. 2) Understand recent developments in payment policy for breast imaging. 3) Understand possible future direction of payment policy for breast imaging.

RC515C Breast Density

Participants
Jennifer A. Harvey, MD, Charlottesville, VA, (jharvey@virginia.edu) (*Presenter*) Researcher, Hologic, Inc; Researcher, VuCOMP, Inc; Researcher, Matakina Technology Limited; Shareholder, Matakina Technology Limited; Shareholder, Hologic, Inc

LEARNING OBJECTIVES

1) Be familiar with the grassroots political efforts of women with dense breast tissue. 2) Understand imaging options for women with dense tissue. 3) Understand implications of breast cancer risk due to breast density.

ABSTRACT

The sensitivity of mammography is reduced in women with dense breast tissue. Women with extremely dense breasts are more likley to present with an interval palpable cancer between screening exams (17 times more likely in one study). Althoug this is a known limitation, somen undergoing regular screening that develop an interval cancer may feel disinfranchised from mammography. Grassroots efforts have initiated 'density laws' in at least 19 states, and a federal law may ultimately be passed. These laws vary, but informing women of their density is a uniform component. Many laws also mandate discussion of offering additional screening. The efficacy and cost of additional imaging is controversial as is the methodd in which to identify and apply these ancillary tests. Women with high breast density are also at about 4 fold increased risk for developing breast cancer compared with women with fatty breasts, emphasizing that the need to provide better screening strategies may potentially improve overall breast cancer mortality.

RC516

Career Development for Women Radiologists and Radiation Oncologists (In Conjunction with the American Association for Women Radiologists)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S504AB

LM OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Susan J. Ackerman, MD, Charleston, SC (*Moderator*) Nothing to Disclose

Sub-Events

RC516A Residency - What Does It Take?

Participants
Rachel M. Nelson, MD, Charleston, SC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Early identification of the key skills and resources needed to excel in a radiology residency. 2) Application of these skills and resources to build a solid foundation in radiology. 3) Utilization of this foundation to balance clinical duties and continuing education with involvement in non-academic pursuits.

ABSTRACT

Navigating a radiology residency is a daunting task, especially in the beginning. By building a solid foundation, each resident will have the basic skill sets and access to the resources needed to excel. Basic fund of knowledge, early mentorship, and effective communication are key aspects of a strong foundation. Residents can then build on this foundation through residency balancing both continuing education in the more complex realms of radiology as well as involvement in research, national organizations or the local community.

RC516B Climbing the Ladder - Challenges and Opportunity

Participants
Madelene C. Lewis, MD, Charleston, SC, (lewism@musc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify opportunities to ascend the ladder to promotion and leadership roles. 2) Develop strategies to overcome common challenges in building a successful academic career. 3) Formulate a plan to effectively climb the ladder.

ABSTRACT

Climbing the ladder is not an easy task, and along the way you will encounter many challenges and opportunities. However, there are skill sets and practical tips that are useful in turning challenges into opportunities as well as capitalizing on opportunities. Mentorship is invaluable for navigating your climb up the ladder. Mentors can serve as a sounding board and give honest feedback based on their experiences and perspective. Networking is also an effective method for getting in the door and helping with the ascent up. In today's competitive and accelerated world, those looking to advance their careers need to be proactive, develop a plan, and embrace learning new leadership skills.

RC516C Challenges of Private Practice - How to Be Successful

Participants
Beatriz E. Amendola, MD, Coral Gables, FL, (dramendola@gmail.com) (*Presenter*) Speakers Bureau, Varian Medical Systems, Inc

LEARNING OBJECTIVES

1) After this presentation, the participant will be able to identify practical points to help them succeed in developing a private practice, in the field of Radiaiton Oncology. 2) Define polcies to develop a successful practice. 3) Develop resource management with vendors and staff.

ABSTRACT

This presentation will be based on my personal experience of more than 15 years in the private practice of Radiation Oncology, mostly as a solo-practice. The reason I decided to go into private practice, after many years of academia it was my desire to be independent and be able to provide the best quality of medical care for my pratients the way I wanted. Develop a team of excellence is the main ingredient; followed by the ability to provide them with the appropriate technical tools, if possible 'state-of-the-art' or even better, offer the most advanced technology available. Innovative research and emphazise the patient and their family needs in fighting their disease are keys to success. Support of frends and family is essential in this endevour.

RC516D Women at the Top - Do's and Don'ts

Participants
Carol M. Rumack, MD, Aurora, CO, (carol.rumack@ucdenver.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn actions and habits that will help you perform well at a high level in an organization. 2) Learn actions and planning strategy that will help you get your new ideas across in a competitive environment. 3) Learn actions that may be risky to your career.

ABSTRACT

What to do and what not to do at the top levels of an organization are different than just being a team player for one of those leaders. My goals are to teach specific actions that you can use to perform well and to make as many as possible into habits so that you become a reliable and trusted colleague who is listened to for good ideas. How to prepare yourself so that you are ready accept new challenges? It may be your chance to succeed where others hesitate to go! How can you build a support system of other leaders? How do you plan for your ideas to succeed with their support in a top level meeting? In a leadership position there are risky actions that may destroy your credibillity. What should you not be doing? Is it ok to be too cautious to speak? Why does not being visible can help undermine your success?

RC517

Novel Applications of Dual Energy CT

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S504CD

CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Myrna C. Godoy, MD, PhD, Houston, TX (*Moderator*) Nothing to Disclose

Sub-Events

RC517A Dual-Energy CT: Thoracic Applications

Participants
Myrna C. Godoy, MD, PhD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To comprehend the basic physical principles of dual-energy CT (DECT). 2) To review the current clinical potential applications of DECT in thoracic imaging.

ABSTRACT

There are different methods by which dual-energy CT images can be generated. The advantages of DECT technique are twofold: 1) Low kilovoltage imaging with increased iodine conspicuity (based on increased photoelectric interactions) is especially useful for evaluation of vascular structures. 2) Material specific post-processing allows material differentiation (based on the differential CT attenuation of selected substances at two different energies), which can be tailored for each particular clinical indication, for example to evaluate for contrast enhancement in pulmonary nodules. The current potential clinical applications of DECT in thoracic imaging include evaluation of pulmonary arteries, aorta, pulmonary nodules, pleural masses and airways disease.

RC517B New Insights on Dual Energy CT in Oncology

Participants
Carlo N. De Cecco, MD,PhD, Charleston, SC, (dececco@musc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe the basic principles of DECT imaging. 2) To explain how post-processing is practised. 3) To discuss radiation exposure issues. 4) To critically appraise the strengths and weaknesses of the technique in oncologic imaging. 5) To comment on the contribution of DECT imaging in oncologic patients management.

ABSTRACT

Dual Energy CT (DECT) is an innovative imaging technique, whose basic principle is the application of two distinct energy settings making able to distinguish materials with different molecular composition on the basis of their attenuation profiles and thus operating a transition from density based image to spectral imaging. DECT applications are based on two distinct capabilities: 1) material differentiation, which means achieving material-specific imaging with separation of distinct materials, for example iodine, calcium, and uric acid, within an image obtained during a single examination and 2) material identification and quantification, which means accurate assessment of the presence and amount of iodine within a target lesion. In particular, with DECT acquisition multiple data-sets such as elemental decomposition analysis, iodinated density map, monochromatic images or virtual unenhanced images can be obtained simultaneously making the Radiologist able to address different diagnostic problems and improving lesion detection and characterization. These technical characteristics make DECT an innovative imaging modality particularly useful in oncologic imaging, having clear advantages in tumor detection, lesion characterization, evaluation of response to therapy, and detection of oncologic-related disease.In conclusion, DECT represents an innovative imaging technique, which can significantly impact on the management of oncologic patients.

RC517C Musculoskeletal Imaging with DECT

Participants
Savvas Nicolaou, MD, Vancouver, BC (*Presenter*) Institutional research agreement, Siemens AG

LEARNING OBJECTIVES

1) Review the technique and principles of DECT and spectral imaging as it pertains to the musculoskeletal applications. 2) Demonstrate the musculoskeletal applications of DECT/spectral imaging in musculoskeletal imaging with an emphasis on the ability to diagnose and monitor progression of gout. 3) Display additional abilities and demonstrate imaging examples of DECT/spectral imaging for identification of bone marrow edema, soft tissue (tendon and ligamentous) injuries, reduction of metal artifacts and novel applications in the assessment of soft tissues. 4) Review the advantages and limitations of DECT compared to other imaging modalities for musculoskeletal imaging.

ABSTRACT

Dual energy CT and Spectral imaging are useful tools for musculoskeletal imaging. We will focus on the utility of this in the setting of musculoskeletal imaging of gout by demonstrating its ability to aid in diagnosis in challenging cases, delineate anatomy of crystal deposition disease, and monitor disease progression and treatment of the monosodium urate crystals. The audience will learn the utility of DECT/Spectral imaging for additional musculoskeletal applications such as characterization of acute bone marrow edema, identification of tendon and ligamentous injuries and reduction of metal artifacts using monoenergetic imaging.

RC518

Radiogenomics of Lung Cancer-Changing Landscape and Challenges

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S403A

CH BQ OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC518A Lung Cancer in the Radiogenomic Era-Implications for Imaging

Participants
Lawrence H. Schwartz, MD, New York, NY (*Presenter*) Committee member, Celgene Corporation; Committee member, Novartis AG; Committee member, ICON plc; Committee member, BioClinica, Inc

LEARNING OBJECTIVES

1) To understand the clinical needs for Radiogenomic Imaging in Lung Cancer. 2) To understand what imaging modalities and quantification techniques can be used in Radiogenomic Imaging in Lung cancer. 3) To illustrate examples of successes and failures in Radiogenomic Imaging approaches in Lung Cancer.

RC518B Qualitative Assessments of Lung Cancer for Radiogenomic Analysis

Participants
Hyun-Ju Lee, MD, PhD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To introduce the results of correlation between imaging features and genetic phenotypes of lung cancer. 2) To describe the implications of imaging traits on pathology, patient prognosis, and genetics. 3) To introduce the role of qualitative assessment for the next step high-throughput quantitative feature selection.

ABSTRACT

RC518C Quantitative Assessment in Lung Cancer Radiogenomics-Reproducibility and Reliability

Participants
Binsheng Zhao, DSc, New York, NY (*Presenter*) License agreement, Varian Medical Systems, Inc; License agreement, Keosys SAS; License agreement, Hinacom Software and Technology, Ltd; License agreement, ImBio, LLC; License agreement, AG Mednet, Inc

LEARNING OBJECTIVES

1) Familiarize the audience with quantitative image features that can be computed to characterize tumors. 2) Discuss reproducibility and reliability of image features due to, repeat CT scans, CT acquisition and reconstruction techniques, tumor segmentations.

ABSTRACT

The way tumors look on radiological images may also reveal their underlying cancer gene expressions. Tumor imaging phenotypes can be characterized not only qualitatively by the radiologist's eyeballing, but also quantitatively by computer through image feature analysis. Radiogenomics promises the ability to assess cancer genotype though the tumor's imaging phenotype. However, to date, little attention has been paid to the sensitivity of image features to repeat scans, imaging acquisition techniques, reconstruction parameters and tumor segmentations. This refresher course will first familiarize the audience with quantitative image features that can be computed to characterize tumor size, shape, edge and density texture statistics. Both phantom and in-vivo studies will be introduced to explain how repeat CT scans and CT imaging acquisition and reconstruction techniques affect the assessment of quantitative image features in lung cancer Radiogenomics studies. Last but not least, the effects of image segmentation on feature calculations will be addressed.

RC520

Molecular and Functional Imaging/Surrogate Markers in Radiation Oncology

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S102C

BQ MI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Anca L. Grosu, MD, Freiburg, Germany (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand challenges of morphological radiological investigations for the detection and characterization of tumor biology and the timely assessment of tumor response in clinical cancer therapy and in clinical trials testing new therapy regimens. 2) To understand the role and the potential of functional and molecular imaging modalities and techniques used a. prior to therapy for tumor delineation and targeting, b. during cytotoxic therapy, such as radiation and chemotherapy for intra-treatment tumor response monitoring, and .) after cytotoxic therapy for response assessment. 3) To apply and integrate imaging modalities into the therapeutic management of cancer. 4) To review the role of imaging as predictors of tumor control and survival and their emerging role as short-term surrogate markers for long-term therapeutic outcome of cancer treatment regimens and its potential for adaptive therapy.

Sub-Events

RC520A Imaging Surrogate Markers in CNS Tumors

Participants
Anca L. Grosu, MD, Freiburg, Germany (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Clinical problem: Limitations of the morphological/radiological investigations (CT and MRI) for the detection of the gross tumor mass and visualization of tumor biology. 2) Gross Tumor Volume (GTV) Delineation: Amino- Acids PET (AA-PET) and SPECT: a. Sensitivity and specificity of MET-PET, FET-PET and IMT-SPECT b. Comparison MET-PET, FET-PET and IMT-SPECT c. AA-PET for GTV delineation in gliomas d. Future trials. 3) Tumor Biologys: a. Glucose metabolism: FDG-PET b. Tumor proliferation: FLT-PET c. Tumor hypoxia: F-MISO-PET d. Tumor angiogenesis: RGD-PET, MRI e. Visualization of tumor stemm cells in vivo: animal-PET f. Tumor heterogeneity: MRI.

ABSTRACT

1) Clinical problem: Limitations of the morphological/radiological investigations (CT and MRI) for the detection of the gross tumor mass and visualization of tumor biology. 2) Gross Tumor Volume (GTV) Delineation: Amino- Acids PET (AA-PET) and SPECT: a. Sensitivity and specificity of MET-PET, FET-PET and IMT-SPECT b. Comparison MET-PET, FET-PET and IMT-SPECT c. AA-PET for GTV delineation in gliomas d. Future trials. 3) Tumor Biologys: a. Glucose metabolism: FDG-PET b. Tumor proliferation: FLT-PET c. Tumor hypoxia: F-MISO-PET d. Tumor angiogenesis: RGD-PET, MRI e. Visualization of tumor stemm cells in vivo: animal-PET f. Tumor heterogeneity: MRI.

RC520B Imaging Surrogate Markers in Pelvic Tumors

Participants
Nina A. Mayr, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC520C Imaging Surrogate Markers in Lung Tumors

Participants
Meng X. Welliver, MD, Columbus, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC520D Imaging Surrogate Markers in Head and Neck Cancer

Participants
Min Yao, MD, PhD, Cleveland, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Prognostic indications of FDG PET in head and neck cancer. 2) How to use FDG PET in radiation treatment planning in head and neck cancer. 3) Further treatment decision based on PET. 4) Future prospectives including potential new tracers.

RC521

Medical Physics 2.0: Mammography

Wednesday, Dec. 2 8:30AM - 10:00AM Location: N226

BR DM PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ehsan Samei, PhD, Durham, NC (*Director*) Nothing to Disclose
Douglas E. Pfeiffer, MS, Boulder, CO (*Director*) Nothing to Disclose

Sub-Events

RC521A Mammography Perspective

Participants
Douglas E. Pfeiffer, MS, Boulder, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the history and development of mammographic imaging equipment. 2) Understand the impact of equipment development on testing protocols. 3) Understand the impact of equipment development on regulation.

ABSTRACT

Mammographic imaging has undergone tremendous change since its inception. Rapid development from screen-film imaging to nearly universal acceptance of digital imaging has required a shift in testing methodology. This talk will briefly introduce the developments that have taken place and discuss the impact that this development has had on testing and regulation.

RC521B Mammography 1.0

Participants
Melissa C. Martin, MS, Gardena, CA (*Presenter*) Nothing to Disclose
Eric A. Berns, PhD, Denver, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Current requirements for Quality Control for Hologic Digital Mammography Units. 2) Current requirements for Quality Control for General Electric Digital Mammography Units. 3) Current requirements for Quality Control for Fuji Computed Radiography for Mammography Units. 4) Current requirements for Quality Control for Printers used with Digital Mammography Units. 5) Current requirements for Quality Control for Monitors used with Digital Mammography Units.

Active Handout:Melissa Carol Martin

http://abstract.rsna.org/uploads/2015/13010862/rc521b.pdf

RC521C Mammography 2.0

Participants
Andrew Karellas, PhD, Worcester, MA (*Presenter*) Research collaboration, Koning Corporation

LEARNING OBJECTIVES

1) To provide an overview of how the Medical Physicist can prepare for the future of clinical mammography physics. 2) To provide a landscape of mammography imaging technologies. 3) To describe methods of image quality metrics, dose reduction, and quality control in relation to mammography technologies. 4) To describe the future roles of the Medical Physicist in clinical mammography physics.

RC522

Personalized Medicine: Head and Neck

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S102D

HN NR RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Kristy K. Brock, PhD, Ann Arbor, MI (*Moderator*) License agreement, RaySearch Laboratories AB;

ABSTRACT

Sub-Events

RC522A IGRT and Anatomical Adaptation

Participants
Emilie Soisson, PhD, Montreal, QC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the evolution of adaptive radiotherapy and relevant technological advances as they pertain to head and neck radiotherapy. 2) Understand the clinical rational for of plan adaptation in the head and neck patient population. 3) Describe possible routes to clinical implementation. 4) Discuss risks associated with adaptive planning workflows and appropriate quality assurance.

ABSTRACT

This session will focus on the practical implementation of adaptive radiotherapy for head and neck cancer. Although the concept of adaptive radiation therapy (ART) has been around for more than two decades, routine plan adaptation has not become standard practice in the management of head and neck cancer despite huge technological advances in imaging, image registration software, and dose calculation speed. The remaining challenges in implementing ART for head and neck cancer in 2015 as well as an update of the demonstrated clinical need will be discussed. Features of successful adaptive radiotherapy implementations will be highlighted as well as a summary of useful clinical tools and required quality assurance.

RC522B Functional Targeting and Adaptation

Participants
Robert Jeraj, Madison, WI (*Presenter*) Founder, AIQ Services

LEARNING OBJECTIVES

1) To learn about appropriate anatomical and imaging modalities for selection and delineation of target volumes in HN. 2) To learn about biologically conformal approaches (dose painting) in HN. 3) To learn about quantitative imaging requirements for RT in HN.

ABSTRACT

Anatomical and molecular imaging is used to tailor radiation treatment by enabling proper selection and delineation of target volumes and organs, which in turn lead to dose prescriptions that take into account the underlying tumor biology. Dose modulation to different parts of target volume may also be used to match variable tumor radiosensitivity (so-called biologically conformal radiotherapy or dose-painting). For accurate implementation of targeted and adaptive IMRT, tools and procedures, such as accurate image acquisition and reconstruction, automatic segmentation of target volumes and organs at risk, non-rigid image and dose registration, and dose summation methods, need to be developed and properly validated.

RC523

Digital Information Security and Medical Imaging Equipment: Threats, Vulnerabilities and Best Practices

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S403B

IN PH SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC523A Medical Device Security in a Connected World

Participants
Kevin McDonald, Rochester, MN, (mcdonald.kevin@mayo.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the changing environment of network and internet connected devices and software. 2) Be aware of the motivations and tatics of current threat actors. 3) Understand common security issues found in medical devices. 4) Know simple actions that can decrease risk.

ABSTRACT

Medical devices are increasingly becoming dependent on technology and network connectivity, at a time that the electronic environment is becoming more dangerous. Because of this medical devices and systems can become easy targets for attackers attempting to access PHI, disrupt patient care or even harm a patient. When tested, these devices have been shown to have multiple vulnerabilities. These vulnerabilities range from hardcoded passwords, publically available service passwords and no encryption of patient data. Because of this institutions using these devices need to work with their vendors to improve the security of medical devices and take actions themselves to help protect their environment and patients.

RC523B Knowing if Your Imaging Systems are Secure and Keeping Them That Way

Participants
J. Anthony Seibert, PhD, Sacramento, CA, (jaseibert@ucdavis.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the vulnerabilities of imaging system modalities to security and privacy breeches. 2) Determine ways to protect and secure imaging systems from internal and external threats. 3) Describe institutional best-practices to maintain protection yet provide necessary accessibility for imaging modalities.

RC523C The US Government and Medical Device Security

Participants
Kevin Hemsley, Idaho Falls, ID (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) What are industrial control systems (ICS) and how do they play in the field. 2) What is the role and capabilities of ICS-CERT (Industrial Control Systems Cyber Emergency Response Team). 3) What is some steps that can be taken to protect ICSs.

RC524

Dialogue with The Joint Commission: New Diagnostic Imaging Standards for CT and MR

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S404AB

CT MR HP

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ehsan Samei, PhD, Durham, NC (*Director*) Nothing to Disclose
Ehsan Samei, PhD, Durham, NC (*Moderator*) Nothing to Disclose
Ehsan Samei, PhD, Durham, NC (*Presenter*) Nothing to Disclose
Alec J. Megibow, MD, MPH, New York, NY (*Presenter*) Consultant, Bracco Group
Richard C. Semelka, MD, Chapel Hill, NC, (richsem@med.unc.edu) (*Presenter*) Research support, Siemens AG.; Consultant, Guerbet SA.
Fergus V. Coakley, MD, Lake Oswego, OR (*Presenter*) Nothing to Disclose
Andrea D. Browne, PhD, Oakbrook Terrace, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe areas addressed by the new and revised imaging standards. 2) Understand why The Joint Commission made changes to and/or revised the diagnostic imaging standards. 3) Describe how compliance with the new and revised imaging standards will be evaluated during the on-site survey. 4) Describe ways to demonstrate compliance with the new and revised imaging standards to promote patient safety and patient care.

ABSTRACT

This presentation will provide an overview of the new and revised diagnostic imaging standards. These new standards impact both Ambulatory Care and Hospital diagnostic imaging customers of the Joint Commission. Topics to be covered include: Background on the new and revised diagnostic imaging standards; an overview of the new and revised diagnostic imaging standards; a description of how compliance with the new and revised diagnostic imaging standards will be evaluated during the on-site survey. It will also provide practical insights and suggestions regarding implementation of the new and revised diagnostic imaging standards to promote patient safety and improve patient care in Joint Commission accredited organizations.

RC525

Radiomics Mini-Course: Promise and Challenges

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S502AB

BQ PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Sandy Napel, PhD, Stanford, CA (*Director*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc

Sub-Events

RC525A An Overview of Radiomics

Participants
Maryellen L. Giger, PhD, Chicago, IL (*Presenter*) Stockholder, Hologic, Inc; Shareholder, Quantitative Insights, Inc; Royalties, Hologic, Inc; Royalties, General Electric Company; Royalties, MEDIAN Technologies; Royalties, Riverain Technologies, LLC; Royalties, Mitsubishi Corporation; Royalties, Toshiba Corporation; Researcher, Koninklijke Philips NV; Researcher, U-Systems, Inc

LEARNING OBJECTIVES

1) Understand the meaning of radiomics relative to computer-aided diagnosis and quantitative imaging. 2) Learn about the current state-of-the-art in radiomics. 3) Appreciate the existing and future potential role of radiomics with other -omics data and within precision medicine.

ABSTRACT

RC525B From Radiomics to Radiogenomics

Participants
Hugo Aerts, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the motivation for integrating imaging with genomic and clinical data. 2) Learn about the methodology for quantitative radiomic analysis Example biomarker quantification studies in Radiomics and Imaging-Genomics (Radiogenomics).

ABSTRACT

RC525C Challenges for Radiomics and Radiogenomics

Participants
Karen Drukker, PhD, Chicago, IL, (kdrukker@uchicago.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognizing potential pitfalls along the radiomics/radiogenomics pipeline. 2) Understanding the crucial role of statistics in the design and evaluation of radiomics/radiogenomics phenotypes and systems.

ABSTRACT

Handout:Karen Drukker

http://abstract.rsna.org/uploads/2015/15003209/referencesCited.docx

RC527

Changing the Way Radiologists Work: How and Why We Need to Embrace a Culture of Safety

Wednesday, Dec. 2 8:30AM - 10:00AM Location: E351

HP SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Kimberly E. Applegate, MD, MS, Zionsville, IN, (keapple@emory.edu) (*Coordinator*) Nothing to Disclose
Kimberly E. Applegate, MD, MS, Zionsville, IN, (keapple@emory.edu) (*Moderator*) Nothing to Disclose
Giles W. Boland, MD, Boston, MA (*Presenter*) Principal, Radiology Consulting Group; Royalties, Reed Elsevier
Nabile M. Safdar, MD, Alpharetta, GA (*Presenter*) Shareholder, Montage Healthcare Solutions, Inc;

LEARNING OBJECTIVES

1) To describe how technology can accelerate an existing culture of safety in radiology. 2) To assess the risks of poor technology implementations when there is a weak safety culture. 3) To identify the highest impact opportunities for improving safety in one's practice through technology. 4) To assess the maturity of one's informatics infrastructure to support a safety program.

RC529

Body MRI: Technical Challenges (An Interactive Session)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: E353B

MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

Sub-Events

RC529A Motion Control Techniques in Body MRI

Participants
Hersh Chandarana, MD, New York, NY (*Presenter*) Equipment support, Siemens AG; Software support, Siemens AG; Consultant, Bayer, AG;

LEARNING OBJECTIVES

1) Understand basic concepts of k-space and acquisition time. 2) Discuss various methods to accelerate acquisition by k-space undersampling. 3) Discuss motion robust acquisition schemes including non-Cartesian k-space sampling.

ABSTRACT

ABSTRACT: Assessment of multiple post-contrast phases after gadolinium contrast injection is essential for lesion detection and characterization, and thus is a routine component of abdominopelvic MRI. Contrast-enhanced multiphase MR examination is usually performed using a T1-weighted fat-saturated 3D volumetric interpolated sequence with Cartesian k-space sampling in a breath-hold. However, this method is sensitive to respiratory motion and can result in suboptimal images in patients who cannot adequately breath-hold. Techniques to overcome this major limitation include rapid imaging to decrease acquisition time and motion robust acquisition schemes. Concept of acquisition time and k-space will be discussed followed by discussion of techniques to perform rapid and motion robust imaging.

RC529B Which Contrast Agent Should I Use?

Participants
Matthew S. Davenport, MD, Cincinnati, OH, (matdaven@med.umich.edu) (*Presenter*) Book contract, Wolters Kluwer nv; Book contract, Reed Elsevier;

LEARNING OBJECTIVES

1) Review common gadolinium-based contrast agents (GBCA). 2) Understand the strengths and weaknesses of various GBCA. 3) Learn the incidence and significance of various risks associated with GBCA administration.

ABSTRACT

This presentation will review the strengths and weaknesses of a variety of modern gadolinium-based contrast agents. Controversies, risks, and benefits will be presented. Practice optimization with respect to selection of a GBCA formulary will be discussed.

RC529C Optimizing Diffusion-Weighted Imaging at 1.5 and 3T

Participants
Dow-Mu Koh, MD,FRCR, Sutton, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand how to get the best body diffusion-weighted MRI at 1.5T and 3.0T by optimizing image signal-to-noise and minimizing image artefacts. 2) To appreciate the additional challenges of body diffusion-weighted MRI at 3.0T. 3. To review newer imaging techniques that can be applied at 3.0T to improve body diffusion-weighted MRI including combinatorial fat suppression schemes, image-based shimming, reduced field-of-view acquisitions and readout-segmented echo-planar imaging techniques.

ABSTRACT

Body diffusion-weighted MRI (DWI) is now widely applied for disease evaluation, especially in oncology. DWI is relatively quick and easy to perform using single-shot echo-planar imaging (EPI) technique. However, imaging optimisation is important to ensure that high quality images are consistently attained. At both 1.5T and 3.0T, parameter optimization is necessary to maximize signal-to-noise (such as by reducing echo-times, using coarser matrix, thicker partition thickness, multiple signal averages) of the acquired images and to minimize potential artefacts (e.g. motion, chemical shift, eddy currents, Nyquist ghosting, susceptibility and G-noise) that will degrade image quality.Although body DWI is generally more robust at 1.5T, recent advances at 3.0T allow high quality DWI images to be obtained, including whole body studies. Imaging at 3.0T has the advantage of higher image signal-to-noise; but is more prone to artefacts arising from chemical shift (suboptimal fat suppression), susceptibility effects and image distortion. Hence, meticulous optimisation of fat suppression (e.g. using combinatorial fat suppression schemes) and avoidance of regions with high susceptibility effects are important. More recently, the introduction of image-based shimming has helped to improve DWI quality at 3.0T, particular for large field-of-view imaging. Image distortion and susceptibility artifacts can be reduced using read-out segmented EPI techniques. The higher signal-to-noise at 3.0T also allows for high spatial resolution reduced field-of-view techniques to be applied.At 3.0T, there is also an opportuity to perform DWI studies on a hybrid PET-MRI system. To maximise

information gained from such studies, protocol design and clinical workflow are important.

RC531

Techniques of Musculoskeletal Interventional Ultrasound (Hands-on)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: E263

MK IR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Veronica J. Rooks, MD, Honolulu, HI (*Moderator*) Nothing to Disclose
Peter L. Cooperberg, MD, Vancouver, BC (*Presenter*) Nothing to Disclose
Alda F. Cossi, MD, Boston, MA (*Presenter*) Nothing to Disclose
Nathalie J. Bureau, MD, MSc, Montreal, QC, (nathalie.bureau@umontreal.ca) (*Presenter*) Equipment support, Siemens AG
James W. Murakami, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Michael A. Mahlon, DO, Tacoma, WA (*Presenter*) Nothing to Disclose
Paolo Minafra, MD, Pavia, Italy, (paolominafra@gmail.com) (*Presenter*) Nothing to Disclose
Paula B. Gordon, MD, Vancouver, BC (*Presenter*) Stockholder, OncoGenex Pharmaceuticals, Inc ; Scientific Advisory Board, Hologic, Inc; Scientific Advisory Board, RealImaging
Hollins P. Clark, MD, MS, Winston Salem, NC (*Presenter*) Nothing to Disclose
Carmen Gallego, MD, Madrid, Spain, (cgallego@salud.madrid.org) (*Presenter*) Nothing to Disclose
Mabel Garcia-Hidalgo Alonso, MD, Madrid, Spain (*Presenter*) Nothing to Disclose
Michael A. Dipietro, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Horacio M. Padua JR, MD, Boston, MA (*Presenter*) Nothing to Disclose
Patrick Warren, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Stephen C. O'Connor, MD, Boston, MA (*Presenter*) Nothing to Disclose
Sara E. Smolinski, MD, Springfield, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify basic skills, techniques, and pitfalls of freehand invasive sonography, with specific focus on musculoskeletal applications. 2) Define and discuss technical aspects, rationale, and pitfalls involved in musculoskeletal interventional sonographic care procedures. 3) Successfully perform basic portions of hands-on US-guided MSK procedures in a tissue simulation learning module, to include core biopsy, small abscess coaxial catheter drainage, cyst and ganglion aspiration, soft tissue foreign body removal, and intraarticular steriod injection. 4) Incorporate these component skill sets into further life-long learning for expansion of competency and prepartaion for more advanced interventional MSK sonographic learning opportunities.

ABSTRACT

Ultrasound Guided Foreign Body Removal: Simulation Training and Clinical implementation Outcomes Purpose: USFBR can be taught to radiologists to generate competency, and radiologists can apply the technique in the patient setting to remove foreign bodies. Materials and Methods: Proof of concept was performed by a radiologist and surgeon removing nine 1-cm foreign bodies using the USFBR method (P) and traditional surgery (S) with and without wire guidance (W) on the cadaver model. Next, USFBR was taught to 48 radiologists at 4 hospitals. Training included didactic and hands-on instruction covering 7 components: instrument alignment, hand/transducer position, forceps use, foreign body definition, forceps grasp, recognition of volume averaging, and oblique cross cut artifact. Pre-training testing assessed single toothpick removal from turkey breast in 15 minutes. Post-training evaluation consisted of 5 toothpick removals. Ongoing clinical implementation data of USFBR by trained radiologists are being collected. Parameters including age of patient, which radiologist, removal success, type and size of foreign body, incision size, foreign body retention time, reason for removal, symptoms, modalities used in detection, wound closure, and sedation are recorded. Data analyzed using chi-squared and Fisher's exact tests for categorical outcomes and analysis of variance for continuous outcomes. Results: USFBR technique shows a higher success rate and smaller incision size in comparison to surgical technique alone in the cadaver. Removal success: P 100%, S 78%, and W 89%. With USFBR training, radiologists' scores improved from 21-52% pre-training to 90-100% post-training ($p<0.001$ for each component). In the clinical setting to date, USFBR has been 100% successful in 7 (of 25 expected) patients, ages 9-73 years, by four radiologists. Parameters included; length 4 to 30 mm, retention 2 to 864 days, incision, 2 to 8 mm. 1 suture closure. 1 sedation. Conclusion: USFBR is superior to non-guided surgical technique. The USFBR approach taught in simulation improves radiologist technique and removal outcomes. A radiologist who completes simulation training can remove a variety of imbedded foreign bodies.

RC532

What Is Driving Health Care Reform and How It Is Changing Your Radiology Practice

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S105AB

HP LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC532A Impact of Health Care Reform on Radiology: Intended and Unintended

Participants
Lawrence R. Muroff, MD, Tampa, FL, (LRMuroff@hotmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the key elements of health reform as they impact radiology. 2) Develop strategies to deal with the intended and unintended consequences of health care reform. 3) Describe some of the alternative payment mechanisms that will be competing with fee-for-service, and discuss how radiologists will fit into these new compensation dynamics. (This course is part of the Leadership Track)

ABSTRACT

This presentation will review the trends impacting our specialty. Declining reimbursement, non-traditional competition, and more aggressive turf incursion will be examined, and strategies will be offered to enable radiologists the opportunity to survive and thrive in a time of change. The talk will cover alternative payment proposals and possible new practice models. Future opportunites will be discussed. Attendees of this session should have a better understanding of how our specialty will look in the new health care dynamic and what their role will be in this changed environment.

RC532B How has Health Care Reform Affected Funds Flow and Compensation?

Participants
Ronald L. Arenson, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the contributory elements promoting the implementation of significant healthcare reform in Massachusetts. 2) Review both the systemic shortfalls and benefits delivered to the citizens of Massachusetts during that state's implementation of universal health care. 3) Understand broad similarities and differences between the Massachusetts and National models of their respective Affordable Care Acts. (This course is part of the Leadership Track)

RC550

Fallopian Tube Catheterization (Hands-on)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: E260

GU OB

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Amy S. Thurmond, MD, Portland, OR (*Moderator*) Nothing to Disclose
Ronald J. Zagoria, MD, San Francisco, CA, (ron.zagoria@ucsf.edu) (*Presenter*) Nothing to Disclose
Lindsay S. Machan, MD, Vancouver, BC (*Presenter*) Nothing to Disclose
A. Van Moore JR, MD, Charlotte, NC (*Presenter*) Nothing to Disclose
Anne C. Roberts, MD, La Jolla, CA (*Presenter*) Nothing to Disclose
David M. Hovsepian, MD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Obtain hands-on experience with fallopian tube catheterization using uterine models and commercially available catheters and guidewires. 2) Review the evolution of interventions in the fallopian tubes. 3) Learn safe techniques for fallopian tube recanalization for promoting fertility, and fallopian tube occlusion for preventing pregnancy. 4) Discuss the outcomes regarding pregnancy rate and complications. 5) Appreciate ways to improve referrals from the fertility specialists and expand your practice.

ABSTRACT

Fallopian tube catheterization using fluoroscopic guidance is a relatively easy, inexpensive technique within the capabilities of residency trained radiologists. Fallopian tube cathterization can be used to dislodge debris from the tube in women with infertility,or to place FDA-approved tubal occlusion devices in women who do not desire fertility. The fallopian tube is the 1 mm gateway between the egg and the sperm. Noninvasive access to this structure for promoting, and preventing, pregnancy has been sought for over 160 years. This hands-on course allows participants use commercially available catheters and devices in plastic models for fallopian tube catheterization, and to speak directly to world experts about this exciting procedure.

RC551

Pearls and Pitfalls in MSK Radiology

Wednesday, Dec. 2 8:30AM - 10:00AM Location: N227

MK MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC551A MRI of Arthroplasty: How to Do It

Participants
Hollis G. Potter, MD, New York, NY (*Presenter*) Research support, General Electric Company

LEARNING OBJECTIVES

1) To become familiar with different patterns of abnormal synovial response around implants. 2) To become familiar with protocols using standardized and newer sequences which optimize tissue contrast and provide accurate diagnosis.

ABSTRACT

MRI characteristics of adverse local tissue reactions, periprosthetic infection, and component loosening will be reviewed. Characteristics of osteolysis will also be discussed, as well as additional complications of joint arthroplasty.

Active Handout:Hollis G. Potter

http://abstract.rsna.org/uploads/2015/15001917/Active RC551A.pdf

RC551B MRI of Bone Marrow: What's Normal What's Not?

Participants
Miriam A. Bredella, MD, Boston, MA, (mbredella@mgh.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Differentiate normal variations in MRI appearance of bone marrow from malignant marrow infiltrative disorders. 2) Become familiar with the MRI appearance of age-related and post-treatment changes of bone marrow.

ABSTRACT

MRI characteristics of normal bone marrow will be reviewed, including changes related to aging and therapy. Imaging examples of benign and malignant disorders affecting bone marrow will be reviewed including pitfalls in MRI interpretation of bone marrow.

RC551C Tumors and Tumor-like Lesions of the Musculoskeletal System: Pearls and Pitfalls for the General Radiologist

Participants
Behrang Amini, MD, PhD, Houston, TX, (bamini@mdanderson.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with the imaging appearance of common and uncommon presentations of benign and malignant musculoskeletal lesions. 2) Know how to manage indeterminate focal bone and soft tissue abnormalities.

ABSTRACT

Radiologists are often challenged by the overlap in the imaging appearance of benign and malignant musculoskeletal lesions. The imaging appearance of challenging bone and soft tissue lesions will be reviewed. Suggestions will be made for management with the aim of balancing patient safety with the burden of further investigation or intervention.

RC552

Dynamic Musculoskeletal US: Clicks and Clunks of the Lower Extremity (Hands-on)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: E264

MK US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Viviane Khoury, MD, Philadelphia, PA, (viviane.khoury@uphs.upenn.edu) (*Presenter*) Nothing to Disclose
Thomas Moser, MD, Montreal, QC, (thomas.moser@umontreal.ca) (*Presenter*) Nothing to Disclose
Mark Cresswell, MBBCh, Vancouver, BC (*Presenter*) Nothing to Disclose
Jon A. Jacobson, MD, Ann Arbor, MI, (jjacobsn@umich.edu) (*Presenter*) Consultant, BioClinica, Inc; Royalties, Reed Elsevier; ; ;
J. Antonio Bouffard, MD, Detroit, MI (*Presenter*) Nothing to Disclose
Joseph G. Craig, MD, Detroit, MI (*Presenter*) Nothing to Disclose
David P. Fessell, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Ghiyath Habra, MD, Royal oak, MI (*Presenter*) Nothing to Disclose
Joseph H. Introcaso, MD, Neenah, WI (*Presenter*) Nothing to Disclose
Marnix T. van Holsbeeck, MD, Detroit, MI (*Presenter*) Consultant, General Electric Company Consultant, Koninklijke Philips NV Stockholder, Koninklijke Philips NV Stockholder, General Electric Company Grant, Siemens AG Grant, General Electric Company
Kenneth S. Lee, MD, Madison, WI (*Presenter*) Research Consultant, SuperSonic Imagine; Consultant, Echometrix, LLC; Royalties, Reed Elsevier
Humberto G. Rosas, MD, Madison, WI (*Presenter*) Nothing to Disclose
Catherine J. Brandon, MD, Ann Arbor, MI (*Presenter*) Stock options, VuCOMP, Inc
Kambiz Motamedi, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Mary M. Chiavaras, MD, PhD, Ancaster, ON (*Presenter*) Nothing to Disclose
Andrea Klauser, MD, Innsbruck, Austria (*Presenter*) Nothing to Disclose
Robert R. Lopez, MD, Charlotte, NC (*Presenter*) Nothing to Disclose
Carlo Martinoli, MD, Genova, Italy (*Presenter*) Nothing to Disclose
Georgina M. Allen, MBBCh, FRCR, Oxford, United Kingdom (*Presenter*) Nothing to Disclose
Girish Gandikota, MBBS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify anatomic structures which can impinge or move abnormally in the hip and ankle causing pain during normal range of motion. 2) Describe the ultrasound anatomy and scanning technique for a dynamic examination of these lesions. 3) Position patients optimally for the dynamic evaluation of the hip and ankle respecting ergonomics.

ABSTRACT

This course will demonstrate standardized techniques of performing the dynamic examination of hip and ankle lesions that are only or best demonstrated dynamically. These include the snapping hip, peroneal tendon subluxation/dislocation, flexor hallucis longus impingement, and ankle ligament instability. In the first portion of the course, probe positioning will be demonstrated on a model patient with overhead projection during live scanning. In the second portion of the course, an international group of expert radiologists will assist participants in learning positioning and scanning of hip and ankle joint lesions described. An emphasis on dynamic maneuvers and ergonomic documentation of tissue dynamics will be taught. Participants will be encouraged to directly scan model patients.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Jon A. Jacobson, MD - 2012 Honored Educator

RC553

Next Generation IT to Improve Quality and Safety

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S405AB

IN PR SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: .50

Participants
Ramin Khorasani, MD, Roxbury Crossing, MA (*Moderator*) Consultant, Medicalis Corp

ABSTRACT

Improving healthcare system performance is a major national focus. An important element of performance improvement in healthcare is national adoption and meaningful use of interoperable health information technology tools, supported by federal regulations as part of Health Information technology and Economic Health Act (HITECH). Radiology has been a leader in adoption of health IT tools and solutions. In this session, we will review some key, next generation health IT requirements to improve quality of care and patient safety while reducing waste.The speakers will use case example to demonstrate how health IT tools can be used to improve access to imaging, improve appropriateness of imaging ordering, improving radiology report value, enhance communication of critical test results, and enable appropriate follow up imaging and care coordination for patients.

Sub-Events

RC553A Improving Access and Appropriateness

Participants
Keith D. Hentel, MD, MS, New York, NY, (keh9003@med.cornell.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand avialable technologies available for improving access to imaging practices. 2) Understand available technologies for improving appropraiteness of imaging performed.

RC553B Improving Value of Radiology Reports

Participants
Ross W. Filice, MD, Washington, DC, (ross.w.filice@gunet.georgetown.edu) (*Presenter*) Nothing to Disclose

RC553C Improving Communication of Critical Results and Follow-up Recommendations

Participants
Ramin Khorasani, MD, Roxbury Crossing, MA (*Presenter*) Consultant, Medicalis Corp

RC554

Mobile Computing Devices

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S404CD

IN SQ

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.50

Participants
David S. Hirschorn, MD, Staten Island, NY, (hirschorn.david@mgh.harvard.edu) (*Moderator*) Nothing to Disclose
Asim F. Choudhri, MD, Memphis, TN (*Moderator*) Nothing to Disclose
George L. Shih, MD, MS, New York, NY (*Moderator*) Consultant, Image Safely, Inc; Stockholder, Image Safely, Inc; Consultant, Angular Health, Inc; Stockholder, Angular Health, Inc;

Sub-Events

RC554A Introduction

Participants
David S. Hirschorn, MD, Staten Island, NY (*Presenter*) Nothing to Disclose

RC554B Platforms and Security

Participants
George L. Shih, MD, MS, New York, NY (*Presenter*) Consultant, Image Safely, Inc; Stockholder, Image Safely, Inc; Consultant, Angular Health, Inc; Stockholder, Angular Health, Inc;

LEARNING OBJECTIVES

1) Mobile Health: Discuss mobile healthcare trends and evolution involving Apple iOS and Google Android, with specific focus on mobile health apps and platforms, including Apple HealthKit and Apple ResearchKit. 2) Mobile Security: Provide basic understanding of different security concerns in mobile health and discuss options in the healthcare setting.

ABSTRACT

Mobile healthcare devices of all shapes and sizes are now ubiquitous in clinical setting. Radiologists and other providers are leveraging mobile solutions in their clinical workflow. The major mobile platforms provide distinct advantages for both app developers and end users (ie, clinicians and patients) in the healthcare setting. Both iOS and Android platforms have development toolkits that allow for health-related apps. Apple has released HealthKit and ResearchKit, which are more medically focused, and several apps are already available which leverage these new capabilities. A major EHR vendor, EPIC, now has the ability to directly communicate and with a patient's iPhone with bi-directional data-sharing. Wearable devices, such as the Apple iWatch, and other third party mobile health devices are also discussed. The wearable and portable devices will continue to accelerate the shift to mobile healthcare.Mobile devices will need to have the same or enhanced security compared with traditional computers because of increased portability and the Bring Your Own Device (BYOD) phenomenon where clinicians are increasingly using their personal devices for work. Managing enterprise mobile security on a wide range of work and personal mobile devices will remain challenging although can be alleviated by using Mobile Device Manager software which can deploy updates and enforce security policies. Shared mobile devices for patients in the clinical setting may also present similar challenges.

ABSTRACT

Mobile healthcare devices of all shapes and sizes are now ubiquitous in clinical setting. Radiologists and other providers are leveraging mobile solutions in their clinical workflow. The major mobile platforms provide distinct advantages for both app developers and end users (ie, clinicians and patients) in the healthcare setting. The two main platforms for tablet mobile devices are Apple iOS and the Google Android. Mobile devices will need to have the same or enhanced security compared with traditional computers because of increased portability and the Bring Your Own Device (BYOD) phenomenon where clinicians are increasingly using their personal devices for work. Managing enterprise mobile security on a wide range of work and personal mobile devices will remain challenging although can be alleviated by using Mobile Device Manager software which can deploy updates and enforce security policies. Shared mobile devices for patients in the clinical setting may also present similar challenges.

RC554C Apps, Bandwidth, and Integration

Participants
Asim F. Choudhri, MD, Memphis, TN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To have an understanding of available applications available for mobile medical imaging, including native clients, web clients, and virtual desktop/terminal server approaches. 2) To have an understanding of bandwidth concerns in mobile medical imaging, including device data handling, network speeds, and possible bandwidth cost issues. 3) To have an understanding of possible clinical implementations of mobile medical imaging within radiology departments and in health care networks overall.

ABSTRACT

Applications: There are several vastly different approaches to mobile viewing of medical images. Native clients are programs written using a software development kit for a given platform. These clients can retrieve data from remote servers and view locally stored image data. Web clients are web-based programs which are often (but not always) platform independent. They will typically access remotely stored data which may be stored in a local cache but is usually not permanently stored on the mobile device. Virtual desktop/terminal server software allows a mobile device to access a remote computer or server. The remote server handles all

higher level processing and data storage, minimizing the processing requirements of the mobile device but possibly straining bandwidth limitations. Examples of several applications using each of these approaches will be presented, with a discussion of pros and cons for each method as it pertains to an individual user and as it pertains to widespread implementation within a healthcare network. Bandwidth: Viewing medical images may require transfer of datasets that are tens or hundreds of megabytes in size. This provides a special challenge for mobile devices which typically receive data via wireless communication. If using a cellular network, network bandwidth can be a limiting factor (as can data transfer costs). File compression can reduce the size of files, however requires data processing power and may involve compromises in image quality. Once data is on a device, image processing may overwhelm its processing capabilities compared with dedicated PACS workstations. We will discuss both network and device bandwidth concerns as it relates to mobile medical imaging, and possible solutions for overcoming obstacles. Integration into a healthcare system: Mobile review of medical imaging is a tool which has potential to significantly change health care delivery, but the specifics for implementation are unclear. After a device platform has been selected, security protocols established, and bandwidth concerns solved, each institution will need to determine what role this technology will play. Possibilities include radiology residents (or even faculty) consulting with subspecialty faculty, surgeons and interventionalists triaging patients for procedures and for procedure planning, however these approaches are simply extensions of existing practices. New frontiers in consultation will be discussed, including an example involving mobile imaging review in a multidisciplinary stroke team. Guidance will also be provided regarding training and establishing institutional "standard operating procedures" documents. The current state of medical-legal concerns and risk management strategies will also be discussed.

RC554D Displays and Quality Assurance

Participants
David S. Hirschorn, MD, Staten Island, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss ranges of spatial and contrast resolution for medical imaging. 2) Explore options for calibration and quality assurance. 3) Understand the impact of ambient light and viewing distance and angle on medical image display.

ABSTRACT

Mobile devices have significantly smaller displays than desktop or even laptop computers to make them lighter and more easily transported. They are also designed for shorter viewing distances which require smaller pixels. The smaller total display size tends to reduce the number of pixels, while the smaller pixel size tends to increase the number of pixels. On balance, these displays typically have considerably fewer pixels than their stationary counterparts. Nonetheless, even desktop displays typically have less resolution than the original image size of a radiograph which is typically about 5 megapixel (MP) for a chest radiograph. And both types of displays have more resolution than a single CT image, which is 0.25 MP. Since these devices do allow zooming and panning, they may be suitable for image interpretation under controlled circumstances. The main purpose of the DICOM Part 14 Grayscale Display Function is to ensure that contrast is preserved across the range of shades of gray from black to white, particularly at the edges where uncalibrated displays tend to fall off. With desktop displays this can be measured with a photometer, either external or built-in, and graphics adapter adjustments can be made to make the display conformant. Mobile devices typically do not offer this degree of adjustability. This requires a different approach to DICOM curve conformance, and a reasonable alternative is to present the user with a visual challenge to identify low contrast targets placed randomly on the display. If the user can find them and tap on them, then the display may be considered compliant, and if not, then the display should not be relied upon.

RCA41

Mobile Computing for Decision Support and Learning While You Work (Hands-on)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Michael P. D'Alessandro, MD, Iowa City, IA, (michael-dalessandro@uiowa.edu) (*Presenter*) Nothing to Disclose
Jeffrey R. Galvin, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
James J. Choi, MD, West Des Moines, IA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn to perform decision support on a mobile device at the point-of-care to answer questions that arise during clinical work and thus tie learning to practice and receive point-of care CME for it. 2) Learn to read Ebooks and educational apps on a mobile device.3) Learn to stay up-to-date with radiology journals and society news on a mobile device.4) Learn to manage a library of journal articles on a mobile device.5) Learn to view podcasts and vodcasts on a mobile device. 6) Learn to maintain a learning portfolio and learning network on a mobile device.

ABSTRACT

Acquiring and maintaining competency in the practice of radiology requires a program of continuous learning. This continuous learning would be most effectively performed during clinical work, when it has the greatest potential for modifying physicians' knowledge, attitudes, and behaviors as well as positively affecting patients' care, outcomes, and lives. The advent of mobile computing, and the rich assortment of authoritative radiology resources it allows easy access to, now allows this dream to become reality. This course will be a hands-on, state-of-the-art review that will teach the radiologist how to use mobile computing to perform continuous learning while you work. The Apple iOS, Google Android and Microsoft Windows Phone platforms will be covered. Participants will be encouraged to bring their own mobile phone or tablet to the course and will be asked before the course to download into their mobile device several free apps that will be demonstrated, so they can follow along during the session. These free apps are listed on the course handout at http://www.radiologyebooks.com/rsna.html

URL

http://www.radiologyebooks.com/rsna.html

Active Handout:Michael Patrick D'Alessandro

http://abstract.rsna.org/uploads/2015/13013317/RCA41.pdf

RCB41

Hands-on Introduction to Social Media (Hands-on)

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants

C. Matthew Hawkins, MD, Decatur, GA, (matt.hawkins@emory.edu) (*Presenter*) Nothing to Disclose
Safwan Halabi, MD, Stanford, CA (*Presenter*) Nothing to Disclose
Neil U Lall, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose
Tirath Y. Patel, MD, Toledo, OH (*Presenter*) Nothing to Disclose
Amy L. Kotsenas, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Appreciate the professional relevance of social media for radiologists. 2) Understand the differences between Facebook pages and personal accounts. 3) Better grasp how hospitals and groups can use Facebook to connect with patients. 4) Setup and use a Twitter account. 5) Understand the purpose of hashtags, lists, and DMs. 6) Get acquainted with other radiologists and radiology organizations on Twitter. 7) Evaluate enterprise solutions for managing multiple social media accounts for larger groups and organizations. 8) Understand how to safely /securely communicate via social media while maintaining HIPAA requirements.

URL

http://bit.ly/RSNASocialMediaIntro

Active Handout:Safwan Halabi

http://abstract.rsna.org/uploads/2015/11035017/RCB41.pdf

RCC41

Using IHE Profiles to Plan for Medical Imaging

Wednesday, Dec. 2 8:30AM - 10:00AM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
David S. Mendelson, MD, Larchmont, NY (*Moderator*) Spouse, Employee, Novartis AG; Advisory Board, Nuance Communications, Inc; Advisory Board, General Electric Company; Advisory Board, Toshiba Corporation
Kinson Ho, Waterloo, ON, (kinson.ho@agfa.com) (*Presenter*) Employee, Agfa-Gevaert Group
David A. Clunie, MBBS, Bangor, PA (*Presenter*) Owner, PixelMed Publishing LLC
Christopher Lindop, Waukesha, WI (*Presenter*) Employee, General Electric Company
Donald Dennison, Waterloo, ON, (don@dondennison.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Value of IHE with content and vendor neutral integration. 2) How content neutral clinical information is managed with a Vendor Neutral Archive (VNA). 3) Planning for a Vendor Neutral Archive (VNA) or expand upon an existing VNA system to support both imaging and non-imaging content and systems. 4) The benefit of using IHE Imaging profiles for cross-enterprise and cross-community image sharing".

ABSTRACT

Integrating the Healthcare Enterprise (IHE) is a joint initiative of healthcare professionals and industry vendors to improve the way clinical systems in healthcare share information. IHE promotes the coordinated use of established standards such as webservices, DICOM and HL7 to address specific clinical need in support of optimal patient care. Established in 1997, the IHE Radiology Committee, a development domain of IHE, has profiled the clinical use cases to develop a framework of interoperability, known as the IHE Integration Profiles. Integration Profiles are developed specifically to be 'Vendor Neutral'. The first Integration Profile developed by IHE is known as Scheduled Workflow. It specifies how imaging departmental workflow can operate seamlessly between vendors. The Integration Profiles are maintained and published by IHE in the IHE Technical Framework. With the introduction of Cross-Enterprise Document Sharing (XDS) in 2005, IHE has extended the definition of 'Neutral' to include non-imaging content storage in healthcare. This course will specifically deliver and review the IHE Integration Profiles developed by IHE Radiology and the other IHE domain committees profile which can be used by healthcare professionals and the industry for the interoperability specification, procurement and installation of a 'Content' Vendor Neutral Archive (VNA).

MSRT42

ASRT@RSNA 2015: Working with Obese Patients in Radiography

Wednesday, Dec. 2 9:20AM - 10:20AM Location: N230

OT

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Barbara J. Smith, BS, Portland, OR (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Explain obesity statistics and issues related to radiography. 2) Discuss sensitivity training and communication. 3) Identify transportation and transfer of obese patients for safety of patient and personnel. 4) Describe imaging challenges and how to locate anatomical landmarks. 5) Examine exposure related issues.

ABSTRACT

Obesity is affecting an increasing number of people throughout the world and is a growing global health problem. This presentation will define various degrees of obesity, review the statistics and discuss some of the health impacts. Included is a discussion of equipment specifically designed for transportation and the transfer of obese patients. Radiographic equipment designed to image obese patients will be included. The dignity of the patient should be kept in mind so patient care issues such as sensitivity training and communication require us to be more aware of the issues of obesity. There are many imaging challenges associated with obese patients and it is important to understand that the bony skeleton and organ locations have not changed, but it is difficult to locate common positioning landmarks. A new technique for locating anatomical landmarks will be presented to assist with positioning accuracy. Exposure factor use for images and how it affects the radiographic tube will be covered. Additional considerations will be discussed relating to image receptor size, collimation, focal spot size, grid use, AEC and dose.

Active Handout:Barbara Joeine Smith

http://abstract.rsna.org/uploads/2015/15001464/MSRT42.pdf

MSCP42

Case-based Review of Pediatric Radiology (An Interactive Session)

Wednesday, Dec. 2 10:30AM - 12:00PM Location: S406A

NR NM ER PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Sudha A. Anupindi, MD, Philadelphia, PA (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1)To apply a systematic approach in the evaluation of pediatric diseases. 2)To identify essential imaging features of various pediatric congenital, musculoskeletal, abdominal and neurological diseases using a multimodality approach. 3) To understand and develop best imaging practice for various pediatric diseases.

ABSTRACT

To apply a systematic approach in the evaluation of pediatric diseases To identify essential imaging features of various pediatric congenital, musculoskeletal, abdominal and neurological diseases using a multimodality approach To understand and develop best imaging practice for various pediatric diseases

Sub-Events

MSCP42A Pediatric Brain Abnormalities

Participants
Manohar M. Shroff, MD, Toronto, ON, (manohar.shroff@sickkids.ca) (*Presenter*) Consultant, Guerbet SA; Consultant, Magellan Health, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

MSCP42B Pediatric Sport Injuries

Participants
Kirsten Ecklund, MD, Boston, MA, (kirsten.ecklund@childrens.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSCP42C Pediatric Nuclear Medicine Cases

Participants
Ruth Lim, MD, Boston, MA (*Presenter*) Consultant, Alexion Pharmaceuticals, Inc; Officer, New England PET Imaging System

LEARNING OBJECTIVES

View learning objectives under main course title.

MSES42

Essentials of Breast Imaging

Wednesday, Dec. 2 10:30AM - 12:00PM Location: S100AB

BR DM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

MSES42A Update on Breast US BI-RADS

Participants
Marcela Bohm-Velez, MD, Pittsburgh, PA (*Presenter*) Consultant, Koninklijke Philips NV; Researcher, Siemens AG; Researcher, Dilon Technologies, Inc;

LEARNING OBJECTIVES

1) Discuss the need to optimize the sonographic technique and understand breast anatomy for best use of the US lexicon. 2) Discuss the descriptors that are used in assessing a lesion and the need for consistent and standardized terminology. 3) Discuss integration of US findings with mammographic, MRI and MBI studies and the subsequent management options.

ABSTRACT

The ACR BI-RADS for US is designed to standardize reporting, providing an organized approach to image interpretation and management. Understanding breast anatomy and optimizing the sonographic image is crucial for using the lexicon, which enables better communication of results to other physicians and their patients.This will also facilitate data collection for audits to monitor results and determine accuracy of image interpretation.Use and examples of the descriptors will be discussed.

MSES42B Imaging the Post-Surgical Breast

Participants
Ellen B. Mendelson, MD, Chicago, IL, (emendels@nm.org) (*Presenter*) Medical Advisory Board, Delphinus Medical Technologies, Inc; Research support, Siemens AG; Consultant, Siemens AG; Speaker, Siemens AG; Medical Advisory Board, Quantason, LLC; Consultant, Quantason, LLC;

LEARNING OBJECTIVES

1) Recognize postsurgical changes on mammography, US, and MRI. 2) Define the time course of posttherapy changes, which slowly resolve after radiation therapy. 3) Describe surgical and reconstructive procedures used in treatment of breast cancer.

ABSTRACT

MSES42C Tomosynthesis - Is It Ready for Screening?

Participants
Fiona J. Gilbert, MD, Cambridge, United Kingdom (*Presenter*) Medical Advisory Board, General Electric Company; Research Grant, GlaxoSmithKline plc; Research Grant, General Electric Company

LEARNING OBJECTIVES

1) To learn about the evidence from retrospective studies for screening with Digital Breast Tomosynthesis. 2) To learn about the evidence from prospective studies for screening with Digital Breast Tomosynthesis. 3) To appreciate the information that is still required before adoption into routine screening.

MSSR42

RSNA/ESR Emergency Symposium: Chest Emergencies (An Interactive Session)

Wednesday, Dec. 2 10:30AM - 12:00PM Location: S402AB

CH ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ronald J. Zagoria, MD, San Francisco, CA, (ron.zagoria@ucsf.edu) (*Moderator*) Nothing to Disclose
Andras Palko, MD, PhD, Szeged, Hungary (*Moderator*) Medical Advisory Board, Affidea Group;

Sub-Events

MSSR42A Thoracic Injuries

Participants
Jorge A. Soto, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To recognize the most common vascular injuries seen in the setting of blunt thoracic trauma. 2) To understand the importance of differentiating traumatic aortic injuries from mimics, especially congenital variants. 3) To present a classification scheme that distinguishes between minor and major aortic injuries and how this classification influences patient management management. 4) Illustrate with examples other important injuries resulting from chest trauma: major airways, heart, lung parenchyma, pleura and diaphragm.

ABSTRACT

Vascular injuries caused by blunt or penetrating trauma are common and highly lethal. In patients who survive the initial event, rapid evaluation with CT may be life saving. This presentation will focus on the importance of recognizing the CT signs used to diagnose major and minor aortic injuries and will introduce a classification method that helps direct patient management. Other important injuries that the radiologist needs to be aware of will also be reviewed, such as those affecting the major airways, heart and diaphragm. The emerging role of CT in the management of penetrating thoracic trauma will also be discussed. Finally, examples illustrating potential pitfalls leading to false-negative or false-positive interpretations will be highlighted.

Honored Educators

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Jorge A. Soto, MD - 2013 Honored Educator
Jorge A. Soto, MD - 2014 Honored Educator
Jorge A. Soto, MD - 2015 Honored Educator

MSSR42B Non-Traumatic Thoracic Emergencies

Participants
Cornelia M. Schaefer-Prokop, MD, Nijmegen, Netherlands (*Presenter*) Advisory Board, Riverain Technologies, LLC

LEARNING OBJECTIVES

1) To get familiar with protocols and diagnostic performance of comprehensive cardiothoracic CT examinations to determine the presence of vascular life threatening events such as aortic dissection, acute coronary disease and pulmonary embolism. 2) To illustrate typical but also less classic CXR and CT findings of patients with pulmonary or mediastinal diseases causing acute dyspnoea and / or requiring immediate treatment and to learn about key imaging findings in these patients allowing for a fast differential diagnosis. 3) To learn how to adapt CT protocols to CXR findings and to integrate imaging findings with lab findings, patient history and clinical information for making the diagnosis.

ABSTRACT

Pulmonary symptoms such as chest pain, shortness of breath or wheezing are common non-traumatic symptoms prompting ER visits. Because clinical symptoms are very non-specific, imaging plays a major role in differentiating life threatening from less severe diseases and forming a diagnosis. The chest radiograph remains the first imaging despite its limited sensitivity for certain diseases and being prone to inter-observer variability. Comprehensive cardiothoracic CT examinations using most modern CT equipment are well evaluated in their diagnostic accuracy to determine the presence of vascular life threatening events such aortic dissection, acute coronary disease and pulmonary embolism. Protocols, literature evidence and appropriate examples will be discussed. In addition the course will highlight nonvascular emergencies such as mediastinal diseases (e.g., esophageal perforation, mediastinitis or pericarditis) and pulmonary emergencies (e.g., pneumonia, edema, pneumothorax, exacerbation of diffuse lung diseases) for which a more comprehensive consideration of imaging findings, lab findings, patient history and clinical information is needed for making the diagnosis.

MSSR42C Interactive Case Discussion

Participants
Jorge A. Soto, MD, Boston, MA (*Presenter*) Nothing to Disclose

Cornelia M. Schaefer-Prokop, MD, Nijmegen, Netherlands (*Presenter*) Advisory Board, Riverain Technologies, LLC

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Jorge A. Soto, MD - 2013 Honored Educator
Jorge A. Soto, MD - 2014 Honored Educator
Jorge A. Soto, MD - 2015 Honored Educator

RCA42

Creating, Storing, and Sharing Teaching Files Using RSNA's MIRC® (Hands-on)

Wednesday, Dec. 2 10:30AM - 12:00PM Location: S401AB

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Krishna Juluru, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how to install the RSNA MIRC teaching file. 2) Demonstrate the ability to add new studies and create teaching files. 3) Share teaching file cases with other MIRC servers and other users.

ABSTRACT

RCB42

The Electronic Physician Annotation Device (ePAD): An Introduction and Tutorial (Hands-on)

Wednesday, Dec. 2 10:30AM - 12:00PM Location: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Daniel L. Rubin, MD, MS, Palo Alto, CA (*Presenter*) Nothing to Disclose
Debra Willrett, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Evaluate current approaches to collecting image data results (semantic and quantitative image features), and identify gaps in current tools and methods. 2) Identify specific ways the ePAD tool meets current gaps in approaches to collecting semantic and quantitative image features. 3) Describe concrete use cases for ePAD and how its use will improve care thorugh capturing semantic and quantitative image features. 4) Reduce the barrier to adoption and encourage research synergies by demonstrating the use of ePAD in actual patient data and use cases.

ABSTRACT

As biomedical informatics efforts are undertaken to build the learning health system, there is a need to include the information provided by medical imaging in these efforts, since imaging provides detailed information about the disease phenotype for diagnosis and its response to treatment. However, at present, radiology images are not leveraged in many healthcare applications (other than viewing the raw images) because the disease phenotype information they contain is unstructured and not directly machine-accessible. We developed the electronic Physician Annotation Device (ePAD), a freely-available Web-based platform for capturing and storing the phenotypic information contained in radiological images (quantitative and semantic image features) in an explicit, standardized, and machine-accessible format that is interoperable with medical standards such as DICOM and HL7. The ePAD platform is extensible, permitting the community to extend its capabilities with respect to extracting and computing image features, as well as enabling developers to build applications that leverage the information in images in combination with other clinical data. ePAD is being used to at several institutions internationally as well as in national resources such as The Cancer Genome Atlas (TCGA) project of the NIH to enable a coordinated national collection of minable radiological image data. We anticipate the radiology community will find ePAD useful not only in research use cases, but in future clincial applications that optimally leverage the wealth of semantic and quantiative data in images.URL: http://epad.stanford.edu/

Honored Educators

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Daniel L. Rubin, MD, MS - 2012 Honored Educator
Daniel L. Rubin, MD, MS - 2013 Honored Educator

RCC42

Ergonomics

Wednesday, Dec. 2 10:30AM - 12:00PM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

1) The attendee will learn how the radiology reading room environment can physically affect the radiologist. 2) Learn about repetitive stress injuries and how they may affect radiologists and technologists. 3) Learn about how PACS workstations (including mice, keyboards, screens, etc.); room lighting, sounds and temperature; and room furniture may be optimized to help prevent repetitive stress injuries. 4) Learn how radiologic technologists can also be affected by repetitive stress injuries.

ABSTRACT

This presentation will review the features of a reading a study at a PACS, and the interactions of the radiologist with the various devices. This includes desktops/tables height, chairs, keyboard location, monitor position, mouse position (and cleanliness), microphone positioning, room temperature, sound volume, ambient light, and body positioning. Each of these components will be discussed, showing how to prevent future problems with repetitive stress disorders. The goal is to raise awareness of ergonomics for the radiologist.

Sub-Events

RCC42A Introduction to Ergonomics

Participants
William J. Weadock, MD, Ann Arbor, MI (*Presenter*) Owner, Weadock Software, LLC

LEARNING OBJECTIVES

View learning objectives under main course title.

RCC42B Lessons Learned from Our Reading Room of the Future Lab

Participants
Eliot L. Siegel, MD, Severna Park, MD (*Presenter*) Research Grant, General Electric Company; Speakers Bureau, Siemens AG; Board of Directors, Carestream Health, Inc; Research Grant, XYBIX Systems, Inc; Research Grant, Steelcase, Inc; Research Grant, Anthro Corp; Research Grant, RedRick Technologies Inc; Research Grant, Evolved Technologies Corporation; Research Grant, Barco nv; Research Grant, Intel Corporation; Research Grant, Dell Inc; Research Grant, Herman Miller, Inc; Research Grant, Virtual Radiology; Research Grant, Anatomical Travelogue, Inc; Medical Advisory Board, Fovia, Inc; Medical Advisory Board, Toshiba Corporation; Medical Advisory Board, McKesson Corporation; Medical Advisory Board, Carestream Health, Inc; Medical Advisory Board, Bayer AG; Research, TeraRecon, Inc ; Medical Advisory Board, Bracco Group; Researcher, Bracco Group; Medical Advisory Board, Merge Healthcare Incorporated; Medical Advisory Board, Microsoft Corporation; Researcher, Microsoft Corporation

LEARNING OBJECTIVES

View learning objectives under main course title.

RCC42C No Strain, No Pain: A Guide to Reducing Musculoskeletal Strain and Eye Fatigue Among Radiologists

Participants
Rebecca L. Seidel, MD, Atlanta, GA, (rseidel@emory.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

MSRT43

ASRT@RSNA 2015: Best Practices in Digital Radiography

Wednesday, Dec. 2 10:40AM - 11:40AM Location: N230

OT

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Donna L. Long, RT, Indianapolis, IN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss best practices in digital radiography. 2) Comprehend and analyze ASRT position statements and practice standards pertinent to best practices. 3) Analyze the effects of technical factor selection on the digital image. 4) Discuss and apply quality control issues in digital imaging. 5) Analyze and apply exposure indicator systems and values.

ABSTRACT

Digital Radiography has been in practice for quite some time. However we are still working to provide education and best practices for technologists and students regarding the use of digital imaging versus film/screen equipment. This presentation will cover best practices in digital radiography referencing the ASRT white paper, position statements and practice standards. Recommendations regarding future research will also be presented.

Active Handout:Donna L. Long

http://abstract.rsna.org/uploads/2015/15001465/MSRT43.pdf

RCA43

Correlating Imaging with Human Genomics (Hands-on)

Wednesday, Dec. 2 12:30PM - 2:00PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Daniel L. Rubin, MD, MS, Palo Alto, CA (*Presenter*) Nothing to Disclose
Sandy Napel, PhD, Stanford, CA (*Presenter*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc
Olivier Gevaert, PhD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the methods for and the potential value of correlating radiological images with genomic data for research and clinical care. 2) Learn how to access genomic and imaging data from The Cancer Genome Atlas (TCGA) and The Cancer Imaging Archive (TCIA) databases, respectively. 3) Learn about methods and tools for annotating regions within images with semantic and computational features. 4) Learn about methods and tools for analyzing molecular data, generating molecular features and associating them with imaging features.

ABSTRACT

Radiogenomics is an emerging field that integrates medical images and genomic data for the purposes of improved clinical decision making and advancing discovery of critical disease processes. In cancer, both imaging and genomic data are becoming publicly available through The Cancer Imaging Archive (TCIA) and The Cancer Genome Atlas (TCGA) databases, respectively. The TCIA/TCGA provide examples of matched molecular and image data for five cancer types, namely breast, lung, brain, prostate and kidney. The data in TCGA includes various omics data such as gene expression, microRNA expression, DNA methylation and mutation data. The community is beginning to extract image features from the MRI, CT and/or PET images in TCIA, including tumor volume, shape, margin sharpness, voxel-value histogram statistics, image textures, and specialized features developed for particular acquisition modes. They are also annotating the images with semantic descriptors using controlled terminologies to record the visual characteristics of the diseases. The availability of these linked imaging-genomic data provides exciting new opportunities to recognize imaging phenotypes that emerge from molecular characteristics of disease and that can potentially serve as biomarkers of disease and its response to treatment. They also provide an opportunity to discover key molecular processes associated with distinct image features, within one cancer type and across different cancer types. This workshop will describe datasets and tools that enable research at the intersection of imaging and genomics, and that point to opportunities to develop future applications that leverage this knowledge for diagnostic decision support and treatment planning.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Daniel L. Rubin, MD, MS - 2012 Honored Educator
Daniel L. Rubin, MD, MS - 2013 Honored Educator

RCB43

Creating Radiology eBooks for the iPad (Hands-on)

Wednesday, Dec. 2 12:30PM - 2:00PM Location: S401CD

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Henry J. Baskin JR, MD, Salt Lake Cty, UT (*Presenter*) Nothing to Disclose
Justin Cramer, MD, Salt Lake City, UT (*Presenter*) Nothing to Disclose
Justin La Plante, MD, Sayre, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with Apple's free ebook authoring tool, iBooks Author. 2) Create a sample radiology ebook during the course. 3) Learn how to freely share your ebook with others.

RCC43

Clinical Applications of 3D Printing (Part II)

Wednesday, Dec. 2 12:30PM - 2:00PM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Jane S. Matsumoto, MD, Rochester, MN (*Moderator*) Nothing to Disclose
Glenn E. Green, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

RCC43A 3D Printed Models for Interventional Cardiovascular Planning

Participants
Zhen Qian, PhD, Atlanta, GA (*Presenter*) Research Grant, TeraRecon, Inc

LEARNING OBJECTIVES

1) Learn the potential role of 3D printed models in the planning of transcatheter valve replacement. a. Will demonstrate how to produce patient-specific 3D printed models that are anatomically accurate and biomechanically comparable to human valves. b. Will give examples of in-vitro simulation using 3D printed models integrated with sensors and imaging techniques for the planning of transcatheter valve replacement.

RCC43B 3D Printing in Otolaryngology

Participants
Glenn E. Green, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Maryam Ghadimi Mahani, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with role of imaging in 3D print in otolaryngology. 2) Become familiar with novel treatment of tracheobronchomalacia in children using 3D print technology.

ABSTRACT

RCC43C 3D Printing in Interventional Radiology and Vascular Surgery

Participants
Matthew D. Tam, FRCR, Westcliff on Sea, United Kingdom, (matthewtam2005@gmail.com) (*Presenter*) Nothing to Disclose

ABSTRACT

3D printing in medicine and radiology is an exciting and growing field. Vascular surgery and interventional radiology procedures can benefit from 3D printing. It can be incorporated into daily practice through procedure planning and procedure execution. It can potentially advance the field through aiding implant design and development.Learning objectives:1) Understand the potential roles of 3D printing in vascular surgery and interventional radiology2) Gain an overview of the production of solid and hollow luminal models3) See examples of use of 3D models in real cases in a vascular interventional service

RCC43D 3D Printing in Forensic Medicine

Participants
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose

RCC43E 3D Models in Orthopedic Reconstructive Surgery

Participants
Michael Yaszemski, MD, PhD, Rochester, MN, (yaszemski.michael@mayo.edu) (*Presenter*) Nothing to Disclose

RCC43F 3D Printing as an Educational Tool

Participants
Jane S. Matsumoto, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Will demonstrate use of color coded segmentation tools for teacing important anatomic relationships for a range of medical learners. 2) Will provide examples of role of 3D anatomic models of complex disease in enhanicng comprehension of complex anatomy and aid in surgical education. 3) Will highight the value of 3D models in patient education and informed consent.

MSRT44

ASRT@RSNA 2015: Famous Feet: Weber, Lisfranc, and Jones. The Fractures. The Men.

Wednesday, Dec. 2 1:00PM - 2:00PM Location: N230

MK

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Ken L. Schreibman, PhD, MD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To get a better understanding of 3 common fracture patterns in the foot/ankle: a. Ankle twisting injuries and the Weber staging system. b. Fracture/dislocations of the Lisfranc joint c. Fractures of the proximal 5th metatarsal, distinguishing between avulsion and Jones fractures.

Active Handout:Ken L. Schreibman

http://abstract.rsna.org/uploads/2015/15001466/MSRT44.pdf

MSCU41

Case-based Review of US (An Interactive Session)

Wednesday, Dec. 2 1:30PM - 3:00PM Location: S406A

VA IR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Deborah J. Rubens, MD, Rochester, NY (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the diverse applications of ultrasound throughout the body and when it provides the optimal diagnostic imaging choice. 2) Understand the fundamental interpretive parameters of ultrasound contrast enhancement and its applications in the abdomen. 3) Know the important factors to consider when choosing ultrasound vs CT for image guided procedures and how to optimize ultrasound for technical success.

ABSTRACT

Ultrasound is a rapidly evolving imaging modality which has achieved widespread application throughout the body. In this course we will address the major anatomic areas of ultrasound use, including the abdominal and pelvic organs, superficial structures and the vascular system. Challenging imaging and clinical scenarios will be emphasized to include the participant in the decision-making process. Advanced cases and evolving technology will be highlighted, including the use of ultrasound contrast media as a problem solving tool, and the appropriate selection of procedures for US-guided intervention.

Sub-Events

MSCU41A Problem Solving with Contrast Enhanced Ultrasound

Participants
Stephanie R. Wilson, MD, Calgary, AB (*Presenter*) Research Grant, Lantheus Medical Imaging, Inc; Equipment support, Siemens AG; Equipment support, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Attendees will appreciate the multiple varied applications for CEUS in the abdomen. 2) They will recognize the value of CEUS as a real time procedure with exquisite sensitivy to its contrast agent allowing for superior detection of arterial phase vascularity. 3) They will realize the safety of CEUS with no requirement for ionizing radiation, and no nephrotoxicity for evaluation of any problems requiring contrast enhancement in those with renal failure. 4) They will understand the fundamentals for interpretation of contrast enhancement patterns for the noninvasive diagnosis of focal liver masses and other pathology.

ABSTRACT

MSCU41B Image Guided Intervention: When Is Ultrasound Best?

Participants
Michael D. Beland, MD, Providence, RI (*Presenter*) Consultant, Hitachi, Ltd

LEARNING OBJECTIVES

1) Understand factors to consider when choosing ultrasound versus CT as a modality for image guidance. 2) Review the potential challenges and advantages of ultrasound for procedure guidance. 3) Demonstrate the variety of cases for which ultrasound can be used to perform image guided procedures and learn some techniques for maximizing success.

ABSTRACT

Image-guided procedures are commonly performed. There are several important considerations when selecting an appropriate imaging modality to guide the procedure. Ultrasound has several advantages over CT but there are also limitations. These advantages and disadvantages will be reviewed, including various factors to consider when evaluating a case for a potential procedure. When ultrasound is used, there are techniques which may offer increased likelihood of success or decreased procedural time. Through multiple case presentations, this session will review the considerations and techniques for successful ultrasound guided interventions.

MSCU41C Vascular Ultrasound Update

Participants
Laurence Needleman, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSES43

Essentials of Pediatric Imaging

Wednesday, Dec. 2 1:30PM - 3:00PM Location: S100AB

CH ER PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

MSES43A Traumatic Hemorrhage within the Extra-axial Spaces: Accidental or Inflicted?

Participants
Gary L. Hedlund, DO, Salt Lake City, UT, (gary.hedlund@imail.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Contrast the differences between pediatric and adult epidural intracranial hemorrhages. 2) Develop an expanded understanding of traumatic pediatric subdural hemorrhage. 3) Identify the clinical significance and imaging characteristics of subdural hygroma. 4) Describe the CT and MRI features of subdural hemorrhage arising from abusive and accidental trauma. 5) Identify pediatric subarachnoid hemorrhage, recognize its significance, and differentiate it from pseudo-subarachnoid hemorrhage.

ABSTRACT

The presence of post-traumatic hemorrhage within the pediatric intracranial extra-axial compartments should be viewed as a proxy for underlying brain injury. This live RSNA activity will review the coverings of the brain and the compartments that may be involved in accumulating post-traumatic hemorrhage. The session will address hemorrhage within the epidural space, subdural compartment, and subarachnoid space. The focus will be upon hemorrhages within the subdural compartment, their clinical significance in the pediatric population, origin, imaging characteristics, and the features of subdural hemorrhage more commonly observed with accidental and inflicted head trauma. The complimentary nature of non-enhanced CT (NECT) and MRI in characterizing and estimating age of the pediatric subdural hemorrhage will be emphasized. The value of serial imaging will be discussed.

MSES43B Imaging of Congenital Chest Abnormalities

Participants
Stephanie P. Ryan, MD, Dublin, Ireland (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Interpret chest radiographs in newborns with congenital pulmonary abnormality. 2) Plan further imaging assessment in the newborn with congenital pulmonary abnormality. 3) Recognise imaging findings and plan further imaging investigation in an older child with congenital pulmonary abnormality.

ABSTRACT

This session will address the radiographic findings and further imaging in congenital chest abnormalities including cystic adenomatoid malformation, congenital lobar emphysema and different forms of sequestration. The imaging findings of tracheo-esophageal fistula, of chylothorax and of different types of diaphragmatic hernia will also be addressed. There will be an emphasis on the imaging findings that affect management and some controversies around imaging and management will be reviewed.

MSES43C Ventral Wall Abnormalities in the Neonate

Participants
Henry J. Baskin JR, MD, Salt Lake Cty, UT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the most common ventral wall abnormalities in neonates, including omphalocele, gastroschisis, bladder exstrophy, and prune-belly syndrome. 2) Compare and contrast the clinical characteristics of these defects. 3) Identify the imaging features of each of these ventral wall abnormalities. 4) Understand the treatment of these defects, and be familiar with their imaging implications in older children.

ABSTRACT

Neonatal ventral wall abnormalities encompass a broad group of rare congenital defects such as omphalocele, gastroschisis, bladder exstrophy, and prune-belly syndrome. Although these congenital abnormalities are varied in terms of pathophysiology, clinical findings, and treatment, their similarities allow them to be easily confused by radiologists. This is especially problematic as children with ventral wall abnormalities have very high rates of associated gastrointestinal, musculoskeletal, urogenital, and cardiovascular problems, and so often require fairly extensive medical imaging expertise. This activity will compare and contrast the clinical characteristics of ventral wall abnormalities, illustrate the important imaging features of each, and familiarize the attendee with how these abnormalities are treated.

MSSR43

RSNA/ESR Emergency Symposium: Abdominal Emergencies (An Interactive Session)

Wednesday, Dec. 2 1:30PM - 3:00PM Location: S402AB

GI CT ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ronald J. Zagoria, MD, San Francisco, CA, (ron.zagoria@ucsf.edu) (*Moderator*) Nothing to Disclose
Andras Palko, MD, PhD, Szeged, Hungary (*Moderator*) Medical Advisory Board, Affidea Group;

Sub-Events

MSSR43A Abdominal Injuries

Participants
Andras Palko, MD, PhD, Szeged, Hungary, (palko.andras@med.u-szeged.hu) (*Presenter*) Medical Advisory Board, Affidea Group;

LEARNING OBJECTIVES

1) To explain the significance of injury mechanism and its role in the formation of consequent abdominal lesions and their complications. 2) To outline the role of proper imaging technique and diagnostic algorithm in the sufficiently fast diagnosis of abdominal injuries. 3) To learn more about the typical and unusual findings of various abdominal traumatic conditions.

ABSTRACT

Abdominal injuries require a timely and reliable diagnosis in order to prevent the potentially lethal outcome. The armory of clinical tools (physical examination, lab tests) does not fulfill these criteria, since they are either not fast, or not reliable. Imaging diagnostic modalities help the clinician to acquire the necessary amount of information to initiate focused and effective treatment. However, the selection of the appropriate imaging algorithm, modality and technique, as well as the precise detection and interpretation of essential imaging findings are frequently challenging, especially because the circumstances, under which these examinations are performed (open wounds, bandages, non-removable life-supporting equipment, lack of patient cooperation, etc.), are frequently less than optimal. Knowledge of critical imaging signs, symptoms and the role they play in the evaluation of the patient's condition, but also fast decision-making and ability to closely cooperate with the clinicians are skills of key importance for radiologist members of the trauma team.

MSSR43B The Enemy Within, Non-Traumatic Abdominal Emergencies

Participants
Ronald J. Zagoria, MD, San Francisco, CA, (ron.zagoria@ucsf.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Attendees will be able to better analyze CT scans for non-traumatic causes of abdominal pain. 2) Attendees will learn the CT signs and causes of bowel ischemia. 3) Attendees will learn the CT findings of common causes of an "acute" abdomen. 4) Attendees will learn the imaging findings of acute, nontraumatic urinary tract and GI tract emergencies.

ABSTRACT

This segment of the course will go over the optimal imaging approach for patients presenting with acute abdominal pain. CT findings will be emphasized. Key imaging findings of nontraumatic causes of acute abdominal pain including gastrointestinal tract and urinary tract pathology will be explained. A systematic approach for the imaging evaluation of patients wih abdominal emergencies will be illustrated and explained including proper scan protocols and analysis of imaging findings. Imaging diagnosis of urinary tract obstruction, infection, bowel obstruction, and ischemia will be emphasized.

MSSR43C Interactive Case Discussion

Participants
Andras Palko, MD, PhD, Szeged, Hungary (*Presenter*) Medical Advisory Board, Affidea Group;
Ronald J. Zagoria, MD, San Francisco, CA, (ron.zagoria@ucsf.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Attendees will be able to better analyze CT scans for traumatic and non-traumatic causes of abdominal pain. 2) Attendees will learn the CT signs and causes of bowel ischemia and injuries. 3) Attendees will learn the CT findings of common causes of a traumatic and non-traumatic 'acute' abdomen. 4) Attendees will learn the imaging findings of acute, traumatic and nontraumatic urinary tract and GI tract emergencies.

ABSTRACT

Using cases and an audience response system, this segment of the course will go over the optimal imaging approach for patients presenting with acute abdominal pain and abdominalk injuries. CT findings will be emphasized. Key imaging findings of traumatic and nontraumatic causes of acute abdominal pain including gastrointestinal tract and urinary tract pathology will be explained. A systematic approach for the imaging evaluation of patients wih abdominal emergencies will be illustrated and explained including proper scan protocols and analysis of imaging findings. Imaging diagnosis of blunt an penetrating abdominal injuries, urinary tract obstruction, infection, bowel obstruction, and ischemia will be emphasized.

SPHA41

Hospital Administrator's Symposium

Wednesday, Dec. 2 1:30PM - 4:50PM Location: S103AB

HP LM SQ

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

Participants
Jonathan W. Berlin, MD, Evanston, IL (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe possible future health payment and delivery changes and their relationship to radiology. 2) Consider practical techniques for leading change in radiology. 3) Understand methods of radiology data analysis that may be helpful to a hospital. 4) Consider how the principles of high reliability can improve radiology quality. 5) Contemplate the benefits of radiology integration in the era of population health. 6) Familiarize themselves with the 2017 CMS mandate for decision support regarding advanced imaging.

ABSTRACT

This program is geared toward physicians, non-physician healthcare providers, and administrators. Vendors will also find it helpful. The session will be comprised of six speakers, each speaking for 30 minutes. There are two scheduled question and answer periods with ample opportunity for audience discussion if desired. Speakers are a mix of physicians and administrators, and topics are designed to address current strategic planning and economic issues pertinent to radiology, including leadership, the levaging of big data, radiology quality, future healthcare payment and delivery, radiology integration and population health management, and the 2017 CMS mandate for pre-order decision support.

URL

Sub-Events

SPHA41A Introduction

Participants
Jonathan W. Berlin, MD, Evanston, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPHA41B How Your Radiology Group's Big Data can Leverage Your Hospital's Success

Participants
T. Scott Law, Carmel, IN (*Presenter*) Founder, Zotec Partners; CEO, Zotec Partners

LEARNING OBJECTIVES

View learning objectives under main course title.

SPHA41C Practical Techniques for Leading Change in Radiology

Participants
Frank J. Lexa, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPHA41D Healthcare Economics: Market Trends and Transformation

Participants
Tom E. Szostak, Tustin, CA (*Presenter*) Employee, Toshiba Corporation

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

URL

SPHA41E Question and Answer 1

Participants
T. Scott Law, Carmel, IN (*Presenter*) Founder, Zotec Partners; CEO, Zotec Partners
Frank J. Lexa, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPHA41F Radiology Integration: How and Why in the Era of Population Health Management

Participants
John P. Anastos, DO, Park Ridge, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPHA41G The 2017 Mandate for Pre-order Decision Support: What Does It Mean and Why Is It Significant?

Participants
Mark D. Hiatt, MD, MBA, Salt Lake City, UT, (mark.hiatt@regence.com) (*Presenter*) Medical Director, Regence BlueCross BlueShield; Board Member, RadSite ; Former Officer, HealthHelp, LLC

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

View abstract under main course title.

SPHA41H Question and Answer 2

Participants
John P. Anastos, DO, Park Ridge, IL (*Presenter*) Nothing to Disclose
Mark D. Hiatt, MD, MBA, Salt Lake City, UT, (mark.hiatt@regence.com) (*Presenter*) Medical Director, Regence BlueCross BlueShield; Board Member, RadSite ; Former Officer, HealthHelp, LLC

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41

Interventional Oncology Series: Mechanisms Matter: Basic Science Every IO Should Know

Wednesday, Dec. 2 1:30PM - 6:00PM Location: S405AB

GI IR RO

AMA PRA Category 1 Credits ™: 4.50
ARRT Category A+ Credits: 5.00

FDA Discussions may include off-label uses.

Participants
S. Nahum Goldberg, MD, Ein Kerem, Israel, (sgoldber@bidmc.harvard.edu) (*Moderator*) Consultant, AngioDynamics, Inc; Research support, AngioDynamics, Inc; Research support, Cosman Medical, Inc; Consultant, Cosman Medical, Inc;

LEARNING OBJECTIVES

1) Gain an appreciation of the basic scientific underpinnings of interventional oncology. 2) Understand how and why these mechanistic studies can have an impact on both daily clinical practice and future therapeutic paradigms. 3) Characterize the most important advances of tumor ablation over the last two decades. 4) Gain a better understanding of the cutting edge imaging techniques that facilitate successful state of the art interventional oncologic practice.

ABSTRACT

The first half of the session has been organized into a thematic unit entitled: "Mechanisms Matter: Basic science every IO should know" and will be dedicated to gaining an appreciation of the basic scientific underpinnings of interventional oncology and understand how and why such studies can have an impact on both daily clinical practice and future therapeutic paradigms. This will include an initial lecture outlining the many insights and lessons that can be directly applied from radiation therapy and hyperthermia, followed by lectures that center upon key mechanistic pathways that are being used to improve transcatheter embolization and tumor ablation. Two presentations will outline our current understanding of the potential systemic effects of post-procedure, cytokine-mediated inflammation - the negative effects leading to tumorigenesis and the potential beneficial immune (abscopic) effects of IO therapies.A highlight of the session will be a keynote address "20 years of thermal ablation: Progress, Challenges and Opportunities". Dr. Solomon, a noted thought leader in the field will not only characterize the most important advances of tumor ablation over the last two decades and place them in their proper historical and developmental context, but will also identify key areas of research in device and technique development that hold the potential to propel the field forward in the upcoming decade.The second half of the session "Advancing IO with cutting-edge imaging techniques" will be dedicated to the cutting edge imaging modalities that facilitate successful state of the art IO practice. Leading authorities will provide an in depth look at advances and adaptation of 5 of the main technologies as they relate to enhancing interventional oncology including: advanced ultrasound and fusion techniques; state-of-the-art angiographic imaging (including Cone beam CT and subtraction reconstruction); tailoring MR for IO; the the role of PET/CT; and molecular imaging.

Sub-Events

VSIO41-01 Ischemia-The Prime Mover: Apoptosis, Hif-1a, and VEGF Pathways

Wednesday, Dec. 2 1:30PM - 1:45PM Location: S405AB

Participants
Jean-Francois H. Geschwind, MD, Westport, CT (*Presenter*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-02 Exploiting Tumor Hypoxia with Transarterial Chemoembolization to Treat Liver Cancer: Selective Hypoxia-Activated Intra-arterial Therapy in a Rabbit Model

Wednesday, Dec. 2 1:45PM - 1:55PM Location: S405AB

Awards
Trainee Research Prize - Fellow

Participants
Rafael Duran, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Sahar Mirpour, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Vasily Pekurovsky, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Shanmugasundaram Ganapathy-Kanniappan, PhD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Cory F. Brayton, Pharm D, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Toby Charles Cornish, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Consultant, DigiPath, Inc Stockholder, DigiPath, Inc
Boris Gorodetski, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Julius Chapiro, MD, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Ruediger E. Schernthaner, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Constantine Frangakis, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation

PURPOSE

Hypoxia is a common physiological alteration of solid tumors and has been correlated with treatment failure. Hypoxia resulting from embolization also contributes to chemoresistance after TACE. Evofosfamide (Evo) [previoulsy called TH-302] is administered as a nontoxic prodrug which is selectively activated by hypoxia resulting in DNA damage and tumor cell death. The purpose of this study was to investigate the feasibility, safety and antitumor efficacy of hepatic hypoxia;activated intra-arterial therapy (HAIAT) in a rabbit model.

METHOD AND MATERIALS

Twenty-eight VX2 tumor;bearing rabbits were assigned to 4 intraarterial therapy (IAT) regimens: 1) saline (control group); 2) Evo; 3) doxorubicin;Lipiodol emulsion followed by embolization with 100;300µm beads (conventional, cTACE); or 4) a combination of Evo and cTACE (Evo;cTACE). Blood samples were collected pre;IAT, 24/48h and 7/14days post;IAT. Efficacy was assessed quantitatively on MDCT (24h pre;, 7/14 days post;IAT). Necrotic fraction (NF) was quantified on HandE by slide;by;slide segmentation. Hypoxic fraction (HF) and compartment (HC) were determined by pimonidazole staining. Markers of tumor DNA damage, apoptosis, cell proliferation, endogenous hypoxia and metabolism were quantified (γ-H2AX, annexin V, caspase-3, Ki-67, HIF1α, MCT4, LDH).

RESULTS

Evo;cTACE showed similar profile in liver enzyme elevation compared to cTACE except at day 7 where ALT was higher. No hematologic/renal toxicity was observed. Animals treated with Evo-cTACE demonstrated smaller tumor volumes, lower tumor growth rate and higher NF compared to cTACE. Evo resulted in a marked reduction in the HF and HC. A significant negative correlation was found between the HF or HC and the magnitude of the NF. Evo or Evo;cTACE promoted antitumor effects as evidenced by increased expression of γ;H2AX and apoptotic biomarkers, with decreased proliferation. Increased HIF1α expression and tumor glycolysis validated HAIAT.

CONCLUSION

HAIAT with Evo was feasible, had a favorable toxicity profile and demonstrated antitumor effects by selective targeting of tumor hypoxic areas.

CLINICAL RELEVANCE/APPLICATION

The embolic effect of TACE provides an attractive setting for selective activation of bioreductive prodrugs and HAIAT allows for the delivery of high drug doses that may reach tumor regions where hypoxic cells reside in pharmacological sanctuary.

VSIO41-03 Lessons Learned from XRT/Hyperthermia

Wednesday, Dec. 2 1:55PM - 2:10PM Location: S405AB

Participants
Mark W. Dewhirst, DVM, PhD, Durham, NC (*Presenter*) Stockholder, Celsion Corporation; Research Grant, Biomimetix Corporation; Research Grant, Johnson & Johnson; Consultant, Nevro Corp; Consultant, Merck KGaA; Consultant, Siva Corporation

LEARNING OBJECTIVES

1) Understand the complimentary interactions between hyperthermia and radiotherapy that increase cell killing. 2) Understand importance of measuring temperature during heating and methods for how this is accomolished. 3) Be able to articulate how hyperthermia affects tumor physiology and how these effects influence treatment responses.

ABSTRACT

There are more than a dozen positive phase III trials showning that hyperthermia can increase local tumor control when it is combined with radiotherapy. Such trials include head and neck cancer, cervix cancer, GBM, esophageal al cancer and chest wall recurrences of breast cancer. It has been known for more than two decades that hyperthermia augments the cytotoxicity of radiotherapy. Basic tenants underlying this interaction include proof that hyperthermia inhibits DNA damage-repair. Hyperthermia has complimentary cytotoxicity with radiotherapy in different parts of the cell cycle. Further, hyperthermia can increase tumor perfusion, thereby increasing oxygen delivery; lack of oxygen is a source of relative resistance to radiotherapy. In recent years, however, new insights have been made into how these two treatment modalities interact. These insights come from: 1) innovative clinical trials involving functional imaging and genomics and 2) examination of how hyperthermia affects the process of DNA damage repair. These developments point the way toward new methods to further therapeutic gain by taking advantage of cellular responses to these therapies.

VSIO41-04 The Safety and Efficacy Profile of TACE for Treating Hepatocellular Carcinoma in Patients Co-infected with HIV and HCV: A Propensity Score Matching Study

Wednesday, Dec. 2 2:10PM - 2:20PM Location: S405AB

Participants
Jae Ho Sohn, MD,MS, New Haven, CT (*Presenter*) Nothing to Disclose
Reham R. Haroun, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose
Julius Chapiro, MD, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Sonia P. Sahu, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Yan Zhao, MS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Rafael Duran, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Florian N. Fleckenstein, MS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ruediger E. Schernthaner, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Li Zhao, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Susanne Smolka, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation

PURPOSE

Hepatocellular carcinoma (HCC) is becoming an increasing cause of morbidity and mortality in patients co-infected with HIV and HCV. TACE is an important treatment option for unresectable HCC, but to date, there is paucity of data on the safety and efficacy profile of TACE in this specific cohort. The purpose of this study is to compare HCC patients with HIV/HCV co-infection treated with TACE against HCC patients with HCV mono-infection treated with TACE through survival analysis and recording of major complications.

METHOD AND MATERIALS

This single institution and retrospective study included 456 patients. 35 HIV/HCV co-infected HCC patients with CD4 > 100 (group EXP) and 421 HCV-only HCC patients (group CTRL) who received TACE from 2001 - 2014 were included. Propensity score matching (PSM) with the nearest-neighbor method was performed, adjusting for sex, ethnicity, and BCLC/HKLC, which take into account Child-Pugh Class, ECOG performance score, and tumor characteristics. Covariate balance was confirmed. Kaplan-Meier (KM) estimates with median overall survival (MOS) and log-rank statistic were calculated. Cox regression was performed on EXP group to identify infectious disease parameters of potential significance on survival, such as detectable HIV viral load, CD4 count, and anti-retroviral therapy (ART). Significant complications were recorded.

RESULTS

Of the 456 patients, 35 patients in EXP group were successfully matched to 75 patients in CTRL group. 15 (42.9%) patients had detectable HIV viral load. Median CD4 count was 406 x 106 cells/mm3 (range 121 to 1086). 31 (88.5%) patients were on ART. The cohort spanned all BCLC/HKLC stages. KM revealed MOS of 20.0 months for the EXP group and MOS of 21.3 months for the CTRL group (p = 0.907). Cox model on EXP group did not identify any infectious disease variables of significance on survival. No significant complication, such as death, ICU stay, or fulminant liver failure within 30 days of TACE, was observed in the EXP group.

CONCLUSION

In HCC patients with HIV/HCV co-infection and CD4 > 100, TACE demonstrated comparable safety and efficacy profile as in HCC patients with HCV only.

CLINICAL RELEVANCE/APPLICATION

Interventional oncologists should feel comfortable offering TACE as a treatment option to HCC patients with HIV/HCV co-infection.

VSIO41-05 Tailoring Nanodrugs for IO: Free Radicals, Heat Shock Proteins, and beyond

Wednesday, Dec. 2 2:20PM - 2:35PM Location: S405AB

Participants
S. Nahum Goldberg, MD, Ein Kerem, Israel (*Presenter*) Consultant, AngioDynamics, Inc; Research support, AngioDynamics, Inc; Research support, Cosman Medical, Inc; Consultant, Cosman Medical, Inc;

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-06 Circulating Tumor Cells Early Predict Prognosis of Hepatocellular Carcinoma Treated with Transarterial Chemoembolization: A Prospective Study

Wednesday, Dec. 2 2:35PM - 2:45PM Location: S405AB

Participants
Guowei Yang, MD, Shanghai, China (*Presenter*) Nothing to Disclose
Bo Zhou, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Rong Liu, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Jian-Hua Wang, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the potential utility of circulating tumor cells (CTCs) measurements in predicting prognosis of hepatocellular carcinoma (HCC) patients received transarterial chemoembolization (TACE) treatments, including their differences in different vein sites and the immediate and delayed impact of TACE on CTCs.

METHOD AND MATERIALS

CTCs from consecutive patients with HCC were quantified before and immediately and 6-8 weeks after TACE. CTCs were examined in both samples derived from the peripheral vein (PV) and the hepatic vein (HV).

RESULTS

A total of 46 consecutive patients with HCC were recruited into the prospective study and 38 were analysed at last. CTCs counts in HV were significantly higher than in PV (P<0.001). TACE led to a statistically significant immediate fall in CTCs numbers, especially in HV(P<0.001). Patients with CTCs levels ≥2 in PV or ≥8 in HV at baseline per 7.5 ml blood samples, compared with the group with fewer CTCs in PV or HV, had a shorter median progression-free survival (PFS, 5.2 months vs. 12.0 months, P=0.01; 5.2 months versus 9.5 months, P=0.003, respectively). At the 6-8 weeks after TACE, patients with CTCs ≥2 in PV or ≥3 in HV had a similarly shorter PFS (5.0 months vs. 12.0 months, P<0.001; 5.1 months versus 11.2 months, P<0.001, respectively). Further analysis showed that patients with higher CTC levels also had a higher intrahepatic metastasis rate. The multivariate Cox regression analyses and ROC curves showed that the levels of CTCs at baseline and 6-8 weeks after TACE were significant independent prognostic factors of PFS.

CONCLUSION

The number of CTCs in peripheral and hepatic vein before and 6-8 weeks after TACE are independent predictors of PFS in HCC patients received TACE treatments. TACE immediately reduces the number of CTCs get into the blood circulation.

CLINICAL RELEVANCE/APPLICATION

CTCs detection is a promising method to predict prognosis in HCC patients underwent TACE. TACE immediately reduce the number of CTCs get into the blood and may reduce the rate of metastasis.

VSIO41-07 Understanding Post-procedure Inflammation: AKT and c-met Pathways

Wednesday, Dec. 2 2:45PM - 3:00PM Location: S405AB

Participants
David A. Woodrum, MD, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-08 Microwave Hepatic Ablation Induces Dose Dependent Local Inflammation and Distant Pro-oncogenic Effects

Wednesday, Dec. 2 3:00PM - 3:10PM Location: S405AB

Participants
Erik Velez, BS, San Francisco, CA (*Presenter*) Nothing to Disclose
Nahum Goldberg, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose
Gaurav Kumar, PhD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Yuanguo Wang, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Christopher L. Brace, PhD, Madison, WI (*Abstract Co-Author*) Shareholder, NeuWave Medical Inc; Consultant, NeuWave Medical Inc; Shareholder, Symple Surgical Inc; Consultant, Symple Surgical Inc
Muneeb Ahmed, MD, Wellesley, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine how different doses of microwave ablation (MWA) induce local inflammation and distant pro-oncogenic effects compared to radiofrequency ablation (RFA) in a small animal model.

METHOD AND MATERIALS

F344 rats (n=24) were implanted with single subcutaneous R3230 tumors. Average tumor diameter and tumor growth rates were assessed daily. At mean tumor diameter of 10 mm, animals were divided into four groups (n=6/arm), and assigned to one of four treatments: sham (needle x 5 minutes), RFA (70°C x 5 minutes), rapid high-dose MWA (20W x 15 seconds), or slower low-dose MWA (5W x 2 minutes). Settings were selected to produce 11.4±0.8 mm coagulation zones for all ablation settings. Tumors were measured daily for 7 days post-treatment to determine growth rates. Thickness of periablational liver inflammation (heat shock protein 70; Hsp70), local liver IL-6 levels, and distant tumor proliferative indices (Ki-67) were also compared.

RESULTS

Hepatic MWA-5W and RFA increased distant tumor growth rates compared to the MWA-20W and sham arms, such that the 7 day mean tumor diameter was greater (MWA-5W 16.3±1.1 mm, RFA 16.3±0.9 mm vs. sham 13.6±1.3 mm, $p<0.01$, and MWA-20W 14.6±0.9 mm, $p<0.05$). Although less than MWA-5 or RFA, MWA-20W also resulted in a significantly greater change in tumor diameter compared to the sham arm ($p=0.04$). Similarly, higher distant tumor proliferation was observed after hepatic MWA-5W and RFA, followed by MWA-20W compared to sham (proliferative indices: MWA-5W 0.82±0.05, RFA 0.79±0.05, MWA-20W 0.65±0.02 vs. sham 0.49±0.05, $p<0.01$). Finally, lower-energy hepatic MWA and RFA resulted in greater periablational inflammation (Hsp70: RFA 141.5 µm (mean), MWA-5W 134.1 µm, vs. MWA-20W 67.5 µm, $p<0.01$) with a trend for elevation in IL-6 levels for RFA (542±61 pg/ml) and MWA-5W (486±101 pg/ml), vs. MWA-20W (349±22 pg/mL, $p<0.08$).

CONCLUSION

Hepatic MW ablation can incite periablational inflammation and increased distant tumor growth similar to what has been recently reported for RFA. Yet, such undesired effects may be dependent on heating paradigms, and less pronounced with more rapid, higher power heating.

CLINICAL RELEVANCE/APPLICATION

MWA and RFA can have 'off-target' tumor stimulatory effects, which may be decreased using higher MW energy to reduce secondary inflammation in the tissue surrounding the ablation zone.

VSIO41-09 Systemic Implications of IO Therapies: Increased Tumorigenesis?

Wednesday, Dec. 2 3:10PM - 3:25PM Location: S405AB

Participants
Muneeb Ahmed, MD, Wellesley, MA, (mahmed@bidmc.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-10 Systemic Implications of IO Therapies: Beneficial Immune Effects?

Wednesday, Dec. 2 3:25PM - 3:40PM Location: S405AB

Participants
Joseph P. Erinjeri, MD, PhD, New York, NY, (erinjerj@mskcc.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-11 Panel Discussion: So What Does This All Mean?

Wednesday, Dec. 2 3:40PM - 3:55PM Location: S405AB

Participants

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-12 20 Years of Thermal Ablation: Progress, Challenges and Opportunities

Wednesday, Dec. 2 4:00PM - 4:25PM Location: S405AB

Participants
Stephen B. Solomon, MD, New York, NY (*Presenter*) Research Grant, General Electric Company

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-13 Advancing IO with Cutting-edge Imaging Techniques

Participants

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-14 Advanced Ultrasound and Fusion Techniques

Wednesday, Dec. 2 4:25PM - 4:40PM Location: S405AB

Participants
Luigi Solbiati, MD, Busto Arsizio, Italy, (lusolbia@tin.it) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

VSIO41-15 State-of-the-Art Angiographic Imaging: Cone Beam CT and beyond

Wednesday, Dec. 2 4:40PM - 4:55PM Location: S405AB

Participants
Ming De Lin, PhD, Cambridge, MA (*Presenter*) Employee, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Discuss the role of cone-beam computed tomography (CBCT) for intraprocedural imaging during transcatheter arterial chemoembolization (TACE). 2) Explain the advantages of CBCT over standard 2D angiography in the detection of hepatocellular carcinoma lesions and their feeding arteries. 3) Describe how CBCT during TACE can be used to assess the technical endpoint of embolization. 4) Demonstrate how to choose a CBCT technique using a decision-making algorithm to optimize the use of CBCT at each step of TACE for the identification of the lesion, guidance to reach the lesion, and assessment of embolization end points.

ABSTRACT

Cone-beam computed tomography (CBCT) is an imaging technique that provides 3D imaging intraprocedurally from a rotational scan acquired with a C-arm equipped with a flat panel detector. Utilizing CBCT images during interventional procedures bridges the gap between the world of diagnostic imaging, where the image acquisition is typically performed separately from the procedure, and that of interventional radiology, which traditionally has been 2-dimensional (fluoroscopy and angiography).In the scope of transcatheter arterial chemoembolization (TACE), CBCT is capable of providing more information than standard two-dimensional imaging alone in localizing and/or visualizing liver tumors ("seeing" the tumor) and targeting tumors though precise microcatheter placement in close proximity to the tumors ("reaching" the tumor). It can also be useful in evaluating treatment success at the time of procedure ("assessing" treatment success).

VSIO41-16 Contrast Patterns on Intra-procedural Cone-beam CT Can Predict Early Tumor Response to DEB-TACE in Patients with Hepatocellular Carcinoma

Wednesday, Dec. 2 4:55PM - 5:05PM Location: S405AB

Participants
Sonia P. Sahu, New Haven, CT (*Presenter*) Nothing to Disclose
Ruediger E. Schernthaner, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Yan Zhao, MS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Jae Ho Sohn, MD,MS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Florian N. Fleckenstein, MS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Alessandro G. Radaelli, PHD, MS, Best, Netherlands (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Martijn Van Der Bom, MSC, Andover, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Rafael Duran, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation

PURPOSE

Cone-beam CT (CBCT) is routinely utilized to determine the optimal location for drug delivery and technical success of embolization during drug-eluting beads transarterial chemoembolization (DEB-TACE). As such, the relationship between intraprocedural CBCT findings and therapy response should be investigated. This study examined whether quantified contrast patterns on intraprocedural CBCT could predict tumor response on 1 month follow-up magnetic resonance (MR) imaging in hepatocellular carcinoma (HCC) patients treated with DEB-TACE.

METHOD AND MATERIALS

This retrospective study included 53 lesions in 49 patients (38 men, median age 62.7 years) who underwent DEB-TACE. All patients had a contrast-enhanced CBCT image taken immediately before and an unenhanced CBCT image taken immediately after drug delivery. However, enhancement was seen on the post-TACE CBCT due to retained contrast medium from drug delivery. MR imaging was performed at baseline and 1 month follow-up. On the CBCT images, enhancement of the target lesions was measured in 1 dimension (D), 2D, and 3D. On follow-up MR, patients were classified as responders or non-responders using mRECIST, EASL, and quantitative EASL (qEASL). qEASL defines response as a ≥ 65% decrease in 3D enhancement. To assess whether contrast patterns on CBCT could predict 1 month MR response, uni- and multivariate logistic regressions. Baseline characteristics significant in univariate analysis were included in the multivariate model.

RESULTS

On pre- and post-TACE CBCT, median 1D, 2D, and 3D tumor enhancement was 3.4 vs 3.6 cm (p=0.5), 9.9 vs 10.4 cm2 (p=0.7), and 60.7 vs 73.0 % (p=0.4). Response was seen in 34% (mRECIST) and 38% (EASL and qEASL) of lesions. Neither 1D nor 2D enhancement on CBCT could predict mRECIST or EASL response, respectively. However, 3D enhancement was predictive of qEASL response in univariate (pre-TACE CBCT: OR 1.07, 95% CI 1.03-1.11; post-TACE CBCT: OR 1.10, 95% CI 1.5-1.16) and multivariate analysis adjusted for age, hepatitis C, and tumor size (pre-TACE CBCT: OR 1.06, 95% CI 1.02-1.10; post-TACE CBCT: OR 1.09, 95% CI 1.03-1.15).

CONCLUSION

3D enhancement on intraprocedural CBCT can predict 3D tumor response on MR in HCC patients treated with DEB-TACE.

CLINICAL RELEVANCE/APPLICATION

CBCT contrast patterns during DEB-TACE are associated with future tumor response and therefore should guide intraprocedural decisions.

VSIO41-17 Tailoring MR for IO

Wednesday, Dec. 2 5:05PM - 5:20PM Location: S405AB

Participants
Philippe L. Pereira, MD, Heilbronn, Germany (*Presenter*) Research Consultant, Terumo Corporation; Speaker, AngioDynamics, Inc; Speaker, BSD Medical Corporation; Speaker, Terumo Corporation; Speaker, CeloNova BioSciences, Inc; Speaker, Medtronic, Inc; Speaker, BTG International Ltd; Speaker, Biocompatibles International plc; Advisory Board, Siemens AG; Advisory Board, Terumo Corporation; Advisory Board, Bayer AG; Advisory Board, BTG International Ltd; Advisory Board, Medtronic, Inc; Support, Bracco Group; Support, PharmaCept GmbH; Support, Terumo Corporation; Support, Siemens AG; Support, Novartis AG; Support, GlaxoSmithKline plc; Consultant, CeloNova BioSciences, Inc; Research Grant, Biocompatibles International plc; Research Grant, Siemens AG; Research Grant, Terumo Corporation; Research Grant, BTG International Ltd

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Image guided tumor ablation is a minimally invasive therapy option in the treatment of primary and secondary hepatic malignancies. Magnetic resonance (MR) imaging offers an accurate pre-interventional imaging having important impact on patient selection and planning of the ablation procedure. Peri-interventional imaging is used for targeting, monitoring, and controlling of the ablation procedure. Due to a high soft-tissue contrast offering delineation of tumor tissue and the surrounding anatomy, coupled with multiplanar capabilities, MR imaging is an advantageous targeting technique compared with ultrasonography (US) or computed tomography (CT). Furthermore, a near-online imaging is feasible at interventional MR units facilitating a fast and precise placement of the probe inside the target tissue. MR imaging is sensitive to thermal effects enabling a monitoring of ablation therapy. At low-field, MR scanner T2 weighted sequences are accurate to near-online monitor acute effects of thermally induced coagulation subsequently being supportive to control the ablation procedure. Therefore, MR imaging can fulfil the conditions for overlapping ablations by enabling a precise repositioning of the MR compatible thermal applicator if required. MR imaging can be utilized to define the end point of thermal ablation after complete coverage of the target tissue is verified. Thus, the probability of achieving complete coagulation in larger tumors within a single therapy session is supposedly increased. A monitoring of thermal effects is moreover essential in order to prevent unintended tissue damage from critical structures in the surroundings of the target tissue. Subsequently, the possibility to monitor and control thermal ablation by MR imaging has an important impact on the safety and effectiveness of the ablation procedure. At least, first use of MR compatible microwave antennas will be presented in this refresher.

VSIO41-18 3D Quantitative Tumor Burden Analysis in Patients with Hepatocellular Carcinoma before TACE: Comparing Multi-lesion vs. Single-lesion Imaging Biomarkers as Predictors of Patient Survival

Wednesday, Dec. 2 5:20PM - 5:30PM Location: S405AB

Participants
Florian N. Fleckenstein, MS, New Haven, CT (*Presenter*) Nothing to Disclose
Rafael Duran, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ruediger E. Schernthaner, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Jae Ho Sohn, MD,MS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Sonia P. Sahu, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Yan Zhao, MS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bernhard Gebauer, MD, Berlin, Germany (*Abstract Co-Author*) Research Consultant, C. R. Bard, Inc; Research Consultant, Sirtex

Medical Ltd; Research Grant, C. R. Bard, Inc; Research Consultant, PAREXEL International Corporation;
Bernd K. Hamm III, MD, Berlin, Germany (*Abstract Co-Author*) Research Consultant, Toshiba Corporation; Stockholder, Siemens AG; Stockholder, General Electric Company; Research Grant, Toshiba Corporation; Research Grant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, General Electric Company; Research Grant, Elbit Imaging Ltd; Research Grant, Bayer AG; Research Grant, Guerbet SA; Research Grant, Bracco Group; Research Grant, B. Braun Melsungen AG; Research Grant, KRAUTH medical KG; Research Grant, Boston Scientific Corporation; Equipment support, Elbit Imaging Ltd; Investigator, CMC Contrast AB
Roberto Ardon, Suresnes Cedex, France (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Julius Chapiro, MD, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation

PURPOSE

This study compared the value of multi-lesion vs. single-lesion assessment for the prediction of overall survival (OS) in patients with hepatocellular carcinoma (HCC) before transarterial chemoembolization (TACE) using 3D quantitative and diameter-based tumor burden analysis.

METHOD AND MATERIALS

122 patients with HCC treated with TACE were retrospectively included. Baseline arterial-phase, contrast-enhanced MRI was used to measure overall and enhancing diameters in a total of 296 HCC lesions. A 3D segmentation analysis was performed to assess total liver volumes and to quantify enhancing tumor volume (ETV) for each lesion. Enhancing tumor burden (ETB) was defined as the ratio between total ETV and total liver volume. Patients were stratified into high and low tumor burden groups following the BCLC staging (5cm for unifocal HCC and 3cm for 3 lesions for multifocal HCC; accordingly 65cm3 and 45cm3 were used for 3D cutoffs). A threshold of 4%, based on the ROC curve, was used for ETB. Survival was assessed using Kaplan-Meier analysis as well as uni- and multivariate cox proportional hazard ratios (HR). Concordances of each assessment technique were calculated and the method with the highest correlation was further evaluated in order to identify the ideal number of lesions needed for an accurate prediction of OS.

RESULTS

A significant separation of the survival curves was achieved for all methods (log rank, $p<0.05$). Multivariate analysis, according to 3D methods showed the highest predictivity of OS as compared to 1D techniques (HR 5.2 [95%CI, 3.1-8.8, $p<0.001$] for ETV and HR 6.6 [95%CI, 3.7-11.5, $p<0.001$] for ETB vs. HR 2.6 [95%CI, 1.2-5.6, $p=0.012$] for overall diameter and HR 3.0 [95%CI, 1.5-6.3, $p=0.003$] for enhancing diameter). Concordances were found to be the highest for ETB. The difference between ETB concordances of all (0.782) and single largest lesion (0.759) was below two-times the standard error (0.038).

CONCLUSION

3D quantitative assessment of enhancing tumor burden as represented by the largest HCC lesion is a stronger predictor of OS as compared to diameter-based measurements. Assessing multiple lesions on baseline imaging provides no added accuracy in predicting patient OS.

CLINICAL RELEVANCE/APPLICATION

3D volumetric analysis of the largest lesion is a strong predictor of OS and superior to 1D diameter-based methods used in current staging systems. Hence, 3D methods should be considered for future staging systems.

VSIO41-19 Interventional PET/CT

Wednesday, Dec. 2 5:30PM - 5:45PM Location: S405AB

Participants
Paul B. Shyn, MD, Boston, MA, (pshyn@bwh.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Compare advantages of PET/CT with other imaging modalities in guiding interventional radiology procedures. 2) Describe strategies to improve lesion targeting during PET/CT interventional procedures. 3) Apply various PET/CT imaging techniques for the intraprocedural assessment of tumor ablation margins.

ABSTRACT

Positron Emission Tomography/Computed Tomography (PET/CT) enhances our capabilities in image-guided interventions in multiple ways. PET/CT enables targeting of disease foci not visible using other imaging modalities, provides uninterrupted visibility of targets despite intraprocedural changes in surrounding tissues or thermal effects of ablation, and facilitates unique intraprocedural strategies for assessing tumor ablation results. Many case examples will be shown that highlight rationales, strategies and emerging techniques for successful PET/CT-guided interventions.

VSIO41-20 Molecular Imaging

Wednesday, Dec. 2 5:45PM - 6:00PM Location: S405AB

Participants
Bradford J. Wood, MD, Bethesda, MD (*Presenter*) Researcher, Koninklijke Philips NV Researcher, Celsion Corporation Researcher, BTG International Ltd Researcher, W. L. Gore & Associates, Inc Researcher, Delcath Systems, Inc Pending research funded, Perfint Healthcare Pvt Ltd Patent agreement, VitalDyne, Inc Intellectual property, Koninklijke Philips NV Intellectual property, BTG International Ltd

LEARNING OBJECTIVES

View learning objectives under main course title.

MSRT45

ASRT@RSNA 2015: Interventional Cardiovascular MRI (iCMR): Clinical and Pre-Clinical Applications

Wednesday, Dec. 2 2:20PM - 3:20PM Location: N230

VA IR MR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Jonathan Mazal, MS, RRA, Bethesda, MD (*Presenter*) Nothing to Disclose
Toby Rogers, BA, MRCP, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define interventional cardiovascular magnetic resonance (iCMR). 2) Compare advantages and disadvantages of MRI versus other imaging modalities to guide cardiovascular interventions. 3) Describe personnel and infrastructure requirements to start an iCMR program. 4) Identify current clinical applications of iCMR. 5) Review pre-clinical applications of iCMR to inform future clinical directions.

RCA44

National Library of Medicine: PubMed Tools: Save Searches and Create Personalized Search Options (Hands-on)

Wednesday, Dec. 2 2:30PM - 4:00PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Tina Griffin, Chicago, IL (*Presenter*) Nothing to Disclose
Holly Ann Burt, MLIS, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Personalize PubMed by saving search strategies and creating email alerts. 2) Use My NCBI filters to link to library full-text articles and to focus PubMed searches. 3) Save collections of citations including a personal bibliography.

ABSTRACT

In this hands-on workshop session, explore the free My NCBI tool in PubMed. Discover how to develop and save search strategies, create email alerts on your research topics, and build permanent online bibliographies. With your My NCBI account, add permanent library filters and evidence-based filters to PubMed, use My Bibliography to create an online list of personal publications, limit searches to high impact journals, and utilize the link between the NIH Manuscript Submission System and PubMed. The National Library of Medicine (NLM) provides free web access to nearly 25 million citations for biomedical and clinical medical articles through PubMed.gov; MEDLINE is a subset of PubMed.

Handout:Holly Ann Burt

http://abstract.rsna.org/uploads/2015/15004107/2015myncbiRSNA.pdf

RCC44

Monitoring Radiation Exposure: Standards, Tools and IHE REM

Wednesday, Dec. 2 2:30PM - 4:00PM Location: S501ABC

IN SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Kevin O'Donnell, Vernon Hills, IL (*Moderator*) Employee, Toshiba Corporation;
Kevin O'Donnell, Vernon Hills, IL (*Presenter*) Employee, Toshiba Corporation;
Michael F. McNitt-Gray, PhD, Los Angeles, CA (*Presenter*) Institutional research agreement, Siemens AG; Research support, Siemens AG; ; ; ; ;
William W. Boonn, MD, Penn Valley, PA, (wboonn@gmail.com) (*Presenter*) Founder, Montage Healthcare Solutions, Inc; President, Montage Healthcare Solutions, Inc; Shareholder, Montage Healthcare Solutions, Inc; Shareholder, Nuance Communications, Inc; Shareholder, Merge Healthcare Incorporated

LEARNING OBJECTIVES

1) Learn about key radiation exposure metrics, such as CTDI, and how to interpret them. 2) Learn about radiation exposure monitoring methods and tools including 2a) Capturing dose information with the DICOM Radiation Dose SR (RDSR) standard. 2b) Managing RDSR objects with the IHE Radiation Exposure Monitoring (REM) Profile. 2c) Integrating 'CT dose screens' from legacy systems into RDSR. 2d) Pre-scan dose pop-ups on the CT console defined by the MITA Dose Check standard and AAPM guidance on their use. 3) Learn how to specify the above features when purchasing and integrating Radiology Systems. 9) Learn about components of a dose management program such as protocol optimization. 4) Participation in the ACR Dose Registry, and reporting requirements such as California SB-1237.

Active Handout:Michael F. McNitt-Gray

http://abstract.rsna.org/uploads/2015/11034700/RCC44 RSNA2015_RCC44_Monitoring_Radiation_Dose_mmg_handout.pdf

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William W. Boonn, MD - 2012 Honored Educator

MSRO43

BOOST: Genitourinary-Case-based Review (An Interactive Session)

Wednesday, Dec. 2 3:00PM - 4:15PM Location: S103CD

GU RO

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants

Spencer C. Behr, MD, Burlingame, CA (*Moderator*) Research Grant, General Electric Company; Consultant, General Electric Company
Paul Nguyen, Boston, MA (*Moderator*) Consultant, Medivation, Inc; Consultant, GenomeDx Biosciences Inc
Daniel J. Margolis, MD, Los Angeles, CA, (daniel.margolis@ucla.edu) (*Presenter*) Research Grant, Siemens AG
George B. Rodrigues, MD, London, ON (*Presenter*) Nothing to Disclose
Todd Morgan, MD, Ann Arbor, MI (*Presenter*) Research funded, Myriad Genetics, Inc; Research funded, MDxHealth SA
Russell Szmulewitz, MD, Chicago, IL (*Presenter*) Advisory Board, Pfizer Inc; Advisory Board, Bayer AG

LEARNING OBJECTIVES

1) To apply oncologic decision making in prostate cancer. 2) To recognize critical clinical manifestations of prostate cancer. 3) To discern clinically significant from insignificant signs and findings in prostate cancer.

MSCU42

Case-based Review of US (An Interactive Session)

Wednesday, Dec. 2 3:30PM - 5:00PM Location: S406A

GI GU US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Deborah J. Rubens, MD, Rochester, NY (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the diverse applications of ultrasound throughout the body and when it provides the optimal diagnostic imaging choice. 2) Understand the fundamental interpretive parameters of ultrasound contrast enhancement and its applications in the abdomen. 3) Know the important factors to consider when choosing ultrasound vs CT for image guided procedures and how to optimize ultrasound for technical success.

ABSTRACT

Ultrasound is a rapidly evolving imaging modality which has achieved widespread application throughout the body. In this course we will address the major anatomic areas of ultrasound use, including the abdominal and pelvic organs, superficial structures and the vascular system. Challenging imaging and clinical scenarios will be emphasized to include the participant in the decision-making process. Advanced cases and evolving technology will be highlighted, including the use of ultrasound contrast media as a problem solving tool, and the appropriate selection of procedures for US-guided intervention.

Active Handout:Deborah J. Rubens

http://abstract.rsna.org/uploads/2015/15002752/Active MSCU42.pdf

Sub-Events

MSCU42A Challenging Abdominal Cases

Participants
Oksana H. Baltarowich, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

View abstract under main course title.

MSCU42B Acute Pelvic Pain

Participants
Leslie M. Scoutt, MD, New Haven, CT, (leslie.scoutt@yale.edu) (*Presenter*) Consultant, Koninklijke Philips NV

LEARNING OBJECTIVES

View learning objectives under main course title.

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Leslie M. Scoutt, MD - 2014 Honored Educator

MSCU42C Superficial Ultrasound Imaging: Head to Toe

Participants
Deborah J. Rubens, MD, Rochester, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSES44

Essentials of Neuro Imaging

Wednesday, Dec. 2 3:30PM - 5:00PM Location: S100AB

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

MSES44A Cystic Neck Masses

Participants
Barton F. Branstetter IV, MD, Pittsburgh, PA, (BFB1@pitt.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Categorize cystic neck masses in adults and children. 2) Indicate specific differentiting diagnostic criteria.

ABSTRACT

A nonenhancing, fluid-filled mass is a common finding on cross-sectional imaging of the neck. The location of the mass and its relationship to surrouding structures are critical for categorization of the mass and for providing a specific diagnosis. While congenital causes of cystic neck masses are often discussed, they are less frequent than infectious, developmental, or neoplastic causes. The purpose of this session is to review common and uncommon causes of cystic neck masses and to review the imaging characteristics that differentiate them. Potential pitfalls of imaging will be emphasized.

Active Handout:Barton F. Branstetter

http://abstract.rsna.org/uploads/2015/15001762/MSES44A.pdf

MSES44B Adult Orbital Neoplasms

Participants
Tanya J. Rath, MD, Pittsburgh, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the relevant compartmental anatomy of the orbit. 2) Differentiate the characteristic imaging features of benign and malignant adult orbital neoplasms. 3) Define the role of cross-sectional imaging in the management of orbital neoplasms. 4) Review non-neoplastic mimics of orbital neoplasms.

ABSTRACT

Cross-sectional imaging complements ophthalmologic examination in the evaluation of orbital neoplasms. A relevant succinct differential diagnosis for an orbital mass can be generated based on the morphology, location and extent of a lesion. MRI is critical for treatment planning by characterizing the orbital compartments involved and assessing for intracranial and perineural spread of disease. The purpose of this session is to review the characteristic imaging features of benign and malignant orbital neoplasms. Non-neoplastic processes that can mimic orbital neoplasms will also be discussed. Imaging findings that affect management will be emphasized.

Active Handout:Tanya Jaitley Rath

http://abstract.rsna.org/uploads/2015/15001763/MSES44B AA 12.2.15 FINAL RSNA ORBITS.pdf

MSES44C Imaging Dementia and Memory Loss

Participants
Meike W. Vernooij, MD, Rotterdam, Netherlands, (m.vernooij@erasmusmc.nl) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the minimum requirements for an MRI protocol to image patients suspected of dementia. 2) Read scans from a memory clinic in a standardized way, using available rating scales. 3) Construct a structured radiological report with useful recommendations for the referring clinician.

Active Handout:Meike Willemijn Vernooij

http://abstract.rsna.org/uploads/2015/15001764/MSES44C handouts_RSNA 2015_Meike Vernooij.pdf

MSSR44

RSNA/ESR Emergency Symposium: General Principles, Pediatric and ENT Emergencies (An Interactive Session)

Wednesday, Dec. 2 3:30PM - 5:00PM Location: S402AB

GI HN NR ER PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ronald J. Zagoria, MD, San Francisco, CA, (ron.zagoria@ucsf.edu) (*Moderator*) Nothing to Disclose
Andras Palko, MD, PhD, Szeged, Hungary (*Moderator*) Medical Advisory Board, Affidea Group;

Sub-Events

MSSR44A Polytrauma

Participants
Ulrich Linsenmaler, MD, Munich, Germany (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Demonstrate general principles of diagnostic imaging in Emergency Radiology in traumatic and non-traumatic emergencies. 2) Analyze ethiology, background and management of common radiological emergencies. 3) Identify the role, indications and protocols for US, CR, MDCT in modern emergency radiology.

ABSTRACT

Multiple trauma / polytrauma remains the leading cause of death in a patient population below the age of 45 years. Modern Emergency Radiology plays today a key role in an interdisciplinary team guiding diagnosis and treatment in the initial clinical workup. This lecture will cover the following topics:To describe background, incidence and regional differences in patients with polytrauma / multiple trauma.To appreciate the clinical significance and to analyze critical triage criteria to undergo ER / shock room admission and concepts of initial clinical management (ATLS).To review imaging techniques and radiological management and logistic concepts for patients with polytrauma / multiple trauma within a clinical algorithm. To review the use of whole body computed tomography (WBCT), CTA as well as conventional radiography (CR) and ultrasound (US) in the initial work-up.To describe common and uncommon imaging findings.Image reading and data management, individualized CT protocols and outcome control.

MSSR44B Challenges of Imaging Pediatric Abdominal Emergencies

Participants
Susan D. John, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the variations of pathology that cause abdominal pain and vomiting in infants and children. 2) Plan safe and effective imaging protocols using US, CT, and MRI. 3) Recognize pitfalls in the diagnosis of pediatric abdominal emergencies with imaging.

ABSTRACT

MSSR44C Imaging in ENT Emergencies

Participants
Diego B. Nunez JR, MD, MPH, New Haven, CT, (diego.nunez@yale.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Analyze imaging findings in patients presenting with acute head and neck conditions using a systematic spatial approach. 2) Demonstrate understanding of the role and indications of CT and MR in acute non-traumaric ENT case management. 3) Identify the extent of disease and recognize specific complications of cervicofacial infections.

ABSTRACT

MSRT46

ASRT@RSNA 2015: Prostate Cancer and MR Imaging: What Do We Want to See and How to Get It

Wednesday, Dec. 2 3:40PM - 4:40PM Location: N230

GU MR OI

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
James Stirling, DCR, DMS, Middlesex, United Kingdom, (james.stirling@kcl.ac.uk) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn the anatomy and comon pathology of the prostate gland. 2) To learn the factors and how to optimise prostate sequences eg. T1, T2 and STIR whole pelvis sequences, small field of view T2 axial, sagital and coronal sequences, diffusion weighted imaging, contrast enhanced T1 and T2* dynamic sequences. 3) To learn how different sequences are used with primary, secondary and metastatic prostate cancer. 4) To give a taste of hybid PET/MR 18F Choline imaging.

ABSTRACT

Over the last couple of years MRI of prostate cancer has moved from just T1 and T2 imaging to multi-parametric, multi-modality imaging. To produce high quality imaging, sequence parameter factors have to be optimized, balancing clinical requirements with patient comfort, total on-table time, scanner capabilities and limitations. The lecture will include prostatic anatomy and how different sequences can characterize benign and malignant disease. The talk will show the sequences that are needed and how to optimize them. This will include T2 small field of views, diffusion weighted imaging, T1 and T2* dynamic contrast enhanced sequences and intrinsic susceptibility weighted imaging. As prostate cancer develops and is treated the imaging protocols change. The protocols include surveillance and staging and then progress to recurrence and metastatic whole body imaging. MRI is now being complemented with PET in hybrid machines combining the strengths of both modalities. This lecture will show how MR imaging of malignant prostate disease changes as the disease progresses.

RCC45

Practical Informatics for the Practicing Radiologist: Part One (In conjunction with the Society for Imaging Informatics in Medicine)

Wednesday, Dec. 2 4:30PM - 6:00PM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

1) Define and describe the fundamental components of imaging informatics in a very practical and easy-to-understand way. 2) Understand methods to minimize distraction and reporting time when using speech recognition and structured reporting. 3) Understand the history and basic principles of business analytics.

Sub-Events

RCC45A A Patient's Journey through Imaging Informatics

Participants
Marc D. Kohli, MD, San Francisco, CA (*Presenter*) Research Grant, Siemens AG

LEARNING OBJECTIVES

1) Describe the three major systems used in radiology departments and their function. 2) Provide details regarding the HL7 and DICOM standards including how they are important in radiology workflow. 3) Describe the function of an interface engine in a modern healthcare system.

ABSTRACT

Understanding how the basic systems in a radiology department interact to provide complete workflow is and important building-block for radiologists interested in informatics. This presentation will outline the RIS, PACS, and Voice recognition systems and illustrate how they interact as we follow a patient through the radiology department.

RCC45B Challenges in Enterprise Imaging

Participants
Alex Towbin, MD, Cincinnati, OH, (alexander.towbin@cchmc.org) (*Presenter*) Author, Reed Elsevier; Consultant, Reed Elsevier; Shareholder, Merge Healthcare Incorporated; Consultant, Guerbet SA; Grant, Guerbet SA

LEARNING OBJECTIVES

1) Describe the concept of an enterprise imaging archive. 2) Describe the differences between DICOM-based imaging and non-DICOM-based imaging. 3) Identify the unique challenges associated with incorporating non-DICOM images into an enterprise imaging archive.

ABSTRACT

Over the past 20 years, the field of radiology has built an impressive digital infrastructure, automating many portions of the imaging process from the time of order entry through image distribution. With the advent of small, low-cost, high quality digital cameras, other medical specialties have turned to imaging to visualize and document disorders yet, they have not implemented the same type of digital infrastructure as radiology. Today, thousands of medical images are obtained in hospitals each day. With the increasing reliance on imaging, there is a greater need to build systems and processes to obtain, store, and distribute these images across the enterprise so that health care providers can better care for their patients. Even though many of these problems have been solved in radiology, the solutions are not easily transferred to other specialties due to the differences in imaging hardware and the image acquisition workflow. The purpose of this talk is to describe the problems facing hospitals as they begin to build enterprise imaging archives and to discuss potential solutions to these problems.

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Alex Towbin, MD - 2014 Honored Educator

RCC45C Breaching the Moat: Current Concepts in IT Security

Participants
James Whitfill, MD, Scottsdale, AZ (*Presenter*) President, Lumetis, LLC; Co-author, Hitachi, Ltd

LEARNING OBJECTIVES

1) Understand how the changing nature of security threats requires a new approach to security within the healthcare enterprise. 2) Understand how changes from HIPAA and HITECH affect managing breaches and leaks of PHI.

ABSTRACT

The role of security continues to be elevated as more organizations find themselves victims of hacking and breaches. Banks, retail organizations, insurers and even Children's Hospitals have all been victims of security breeches. While efficient workflow for healthcare providers remains a key focus of imaging informatics, the growing threats from international hacking require greater and greater focus by IT and Healthcare organizations. In response to these developments, an increasing regulatory burden exists to report and mitigate against such breeches. Managing both of these challenges will take increasing amounts of resources in the near future.

SPDL41

RSNA Diagnosis Live™: Neuro and MSK

Wednesday, Dec. 2 4:30PM - 6:00PM Location: E451B

MK NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Paul J. Chang, MD, Chicago, IL, (pchang@radiology.bsd.uchicago.edu) (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Medical Advisory Board, lifeIMAGE Inc; Medical Advisory Board, Merge Healthcare Incorporated
Gregory L. Katzman, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Neety Panu, MD, FRCPC, Thunder Bay, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will be introduced to a series of radiology case studies via an interactive team game approach designed to encourage "active" consumption of educational content. 2) The participant will be able to use their mobile wireless device (tablet, phone, laptop) to electronically respond to various imaging case challenges; participants will be able to monitor their individual and team performance in real time. 3) The attendee will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

SPSC41

Controversy Session: US, CT, or MR Imaging in Possible Appendicitis in Children: Three Pegs and Often Only One Hole

Wednesday, Dec. 2 4:30PM - 6:00PM Location: E451A

GI CT MR US ER PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Nancy R. Fefferman, MD, New York, NY, (nancy.fefferman@nyumc.org) (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

Sub-Events

SPSC41A US

Participants
Nancy R. Fefferman, MD, New York, NY, (nancy.fefferman@nyumc.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the advantages, disadvantages and limitations of US as an effective imaging modality in the diagnosis of appendicitis in children. 2) Review the current literature addressing the diagnostic performance of US for pediatric appendicitis. 3) Discuss the role of US in the imaging evaluation of suspected appendicitis in children.

ABSTRACT

SPSC41B CT

Participants
Michael J. Callahan, MD, Boston, MA, (michael.callahan@childrens.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Highlight the advantages, disadvantages and versatility of computed tomography for the diagnosis of suspected acute appendicitis in children. 2) Describe published sensitivity and specificity values for computed tomography in the setting of suspected acute appendicitis in the pediatric population. 3) Explain the challenges and potential barriers for standardization of pediatric appendicitis clinical practice guidelines at academic and non-academic centers.

SPSC41C MR

Participants
R. Paul Guillerman, MD, Houston, TX, (rpguille@texaschildrens.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Develop an MRI protocol for suspected pediatric appendicitis. 2) Estimate the diagnostic efficacy of MRI for suspected pediatric appendicitis. 3) Appraise how radiation-induced cancer risks and diagnostic performance characteristics influence the optimal selection of US, CT and MRI for suspected pediatric appendicitis.

SPSC42

Controversy Session: Concussion and Dementia: Will Football be the Tobacco of this Century?

Wednesday, Dec. 2 4:30PM - 6:00PM Location: E351

NR ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Michael N. Brant-Zawadzki, MD, Newport Beach, CA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the functional as well pathophysiologic consequences of concussion. 2) Understand the overlap between chronic traumatic encephalopathy and Alzheimer's disease. 3) Understand the prevalence of chronic traumatic encephalopathy, its demographics, and distinguish those features from the more widely prevalent aspects of Alzheimer's dementia related disorders. 4) Properly understand the prognostic risk of contact sports as they relate to the prevalence of dementia in the population at large.

Sub-Events

SPSC42A CTE (Chronic Traumatic Encephalopathy) and Dementia: Causation?

Participants
Michael T. Modic, MD, Cleveland, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSC42B Guilt by Association

Participants
William R. Shankle, MD, MS, Newport Beach, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the distinction between correlation and cause. 2) Understand how one can distinguish between a reported effect that is causal and one that is associational. 3) Apply this approach to Traumatic Brain Injury to examine the evidence of a causal vs. associative effect.

ABSTRACT

Guilt By AssociationWR Shankle, MS MD FACPTraumatic Brain Injury (TBI) is one condition where it seems intuitively obvious that brain trauma CAUSES brain dysfunction. In the past decade, methodological advances in computer science have led to the development of a mathematics called CAUSAL INFERENCE, that can be used to analyze risk factors and distinguish whether they are likely to CAUSE an outcome (e.g. brain dysfunction) or are simply ASSOCATED with the outcome's occurrence. This methodology combines probability theory with graph theory to accomplish this distinction. Causal Inference is very useful because it can analyze observational and other non-randomized studies. Interestingly, a search of the TBI literature identified no studies that have tested the assumption that TBI CAUSES brain dysfunction. One very useful causal inference method, called Targeted Maximum Likelihood Estimation, has been used in observational studies to minimize the chance that a causal effect is not detected due to some type of bias in the study. In simple terms, I will present how TMLE can be used to test the assumption that TBI causes brain dysfunction. Performing such a study on observational data would be of enormous value because of the extremely high probability that TBI does, in fact, cause brain dysfunction. Other risk factors, in which the question of causality is much less clear, can then be examined using TMLE with reference to what TMLE informs us about about TBI.

URL

SPSC43

Controversy Session: CT Perfusion (CTP) and Stroke: RIP?

Wednesday, Dec. 2 4:30PM - 6:00PM Location: S406B

NR CT ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Gordon K. Sze, MD, New Haven, CT (*Moderator*) Investigator, Remedy Pharmaceuticals, Inc

Sub-Events

SPSC43A CTP is Dead

Participants
Ramon G. Gonzalez, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the most important acute ischemic stroke physiology factors for patient outcomes and their relative importance. 2) Recognize the role of the ischemic core size in selecting patients with large vessel occlusion for endovascular therapy. 3) Review the animal literature on the use of CT perfusion for measuring the ischemic core and its value compared to diffusion MRI. 4) Recognize the source and magnitude of measurement error when using CTP including using the 95% confidence interval in ischemic core estimates in individual patients.

ABSTRACT

Recent trials have shown that intervention produces favorable outcomes when acute ischemic stroke patients are selected using CTP. Does that mean that CTP is adequate to decide whether an INDIVIDUAL patient should undergo treatment? The answer is "no". CTP is simply too imprecise to reliably measure the infarct core - the critical parameter for excluding from therapy patients who are at greatest risk of hemorrhagic complications, and are unlikely to benefit. Moreover, there is a more precise alternative, diffusion MRI.CTP measures hemodynamics, not tissue status. Hence, although a marker for irreversible injury absent timely reperfusion, CTP - which reflects a snapshot-in-time - is not a marker for treatment futility. Not surprisingly, validation studies in animal models are sparse and have not been reproduced. All published clinical data are consistent: CTP core estimates have high error. Although CTP may be adequate for selection of patients with small cores, where large measurement errors are of little consequence, the cost is exclusion of many with a high likelihood of treatment benefit8. CTP core-lesions segmented using automated software offer the illusion of quantitative accuracy that simply does not exist. CTP and DWI are different. The inherently poor signal-to-noise ratio (SNR) of post-processed CTP images is another fundamental weakness of the technique. Low SNR measurements may be useful if repeated and a mean calculated; this cannot be done for individual patients. That a strong linear correlation exists between CTP and DWI derived ischemic lesion volumes is not surprising, since both result from the same arterial occlusion. High correlation in a population, however, does not confer high measurement accuracy in an individual. As Bland and Altman pointed out almost 30 years ago, regression analyses are inappropriate to judge the validity of a quantitative clinical test. More appropriate are difference tests that establish the 95% confidence limits. As shown by Schaefer et al, a CBF core measurement of 70 ml could actually range from 11-to-124 ml within the 95% confidence limits; other papers in the CTP literature reveal similar variability.Although this large variability does not preclude using CTP to enroll patients into clinical trials, it does make such selection inherently less efficient compared to using "reference standard" DWI. Indeed, power calculations show that, for a simulated treatment study designed to detect a 20 ml improvement in final infarct volume, using CTP instead of DWI would require at least twice as many patients to reach significance.Given CTP's relative inaccuracy in delineating "core", what is the reason for the good outcome rate using a CTP-based selection strategy? The answer lies in its patient selection criteria. The successful trials used a highly conservative selection strategy, "cherry picking" the very best patients with very small cores who were likely to do well even with alteplase alone. Targeting small cores minimizes the effects of large measurement errors, at the cost of excluding many who might benefit.All agree that clinical trials have demonstrated that thrombolysis and thrombectomy are effective treatments for stroke caused by large vessel occlusion. All agree that identifying a target occlusion is important, and that measurement of the infarct-core is critical. The question centers on whether core measurement by CTP is sufficiently precise to be used for treatment selection in INDIVIDUAL patients? A wealth of theoretical, experimental, and clinical evidence suggests the answer is "no". Many argue that "CTP may be short of perfect, yet close enough." Would an internist accept a blood glucose or INR measurement with >50% error as "close enough"? No, she would not. Why, then, should stroke physicians accept a core measurement error of >50% as "close enough"? Clearly, they should not - especially when a more accurate alternative is readily available.Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. Lancet. 1986 Feb 8;1(8476):307-10.Schaefer PW, Souza L, Kamalian S, Hirsch JA, Yoo AJ, Kamalian S, Gonzalez RG, Lev MH. Limited reliability of computed tomographic perfusion acute infarct volume measurements compared with diffusion-weighted imaging in anterior circulation stroke. Stroke. 2015 Feb;46(2):419-24.

SPSC43B CTP is Underutilized

Participants
Max Wintermark, MD, Lausanne, Switzerland, (max.wintermark@gmail.com) (*Presenter*) Advisory Board, General Electric Company;

LEARNING OBJECTIVES

1) To review the indications of perfusion CT imaging in patients suspected of acute ischemic stroke.

ABSTRACT

Perfusion-CT is an imagig method used to assess the ischemic core and penumbra in acute stroke patients. A prospective multi-center study reported that an absolute cerebral blood volume (CBV) threshold reflected the ischemic core and that a relative mean transit time (MTT) threshold most accurately reflected the penumbra. However, in more recent and larger studies, relative cerebral blood flow (rCBF) was found to be more predictive of the ischemic core (nonviable tissue) than absolute CBV. There is a need for

standardization of the PCT methods used to define the ischemic core and the penumbra.Determination of tissue viability based on imaging has the potential to individualize thrombolytic therapy and extend the therapeutic time window for some acute stroke patients. Although perfusion imaging has been incorporated into acute stroke imaging algorithms at some institutions, its clinical utility has not been proven.It is important to note that perfusion imaging has many applications beyond characterization of the penumbra and triage of patients to acute revascularization therapy. The negative results of the MR RESCUE trial do not negate these potential benefits. These applications include, but are not limited to: (1) improving the sensitivity and accuracy of stroke diagnosis (in some cases, a lesion on PCT leads to more careful scrutiny and identification of a vascular occlusion that was not evident prospectively, particularly in the M2 and more distal MCA branches), (2) excluding stroke mimics, (3) better assessment of the ischemic core and collateral flow, and (4) prediction of hemorrhagic transformation and malignant edema.

URL

SPSC44

Controversy Session: Prostate Imaging: Just What MR Technique is Best?

Wednesday, Dec. 2 4:30PM - 6:00PM Location: E450A

GU MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Rajan T. Gupta, MD, Durham, NC (*Moderator*) Consultant, Bayer AG; Speakers Bureau, Bayer AG; Consultant, Invivo Corporation

LEARNING OBJECTIVES

1) The goal of this session is to explore the different techniques that comprise high quality multiparametric MRI of the prostate. More specifically, we will deal with some of the key protocol questions that one must tackle in order to set up mpMRI in their own practice. Examples of the topics to be discussed include 1.5T vs. 3T imaging; endorectal coil vs. phased array body coil use; the optimal diffusion weighted metrics to be used to assess lesion aggressiveness, etc.; the changing role of dynamic contrast enhanced MRI in prostate imaging, especially in light of the recent release of PI-RADS version 2; and finally, the optimal techniques to evaluate for disease recurrence after therapy. The format of the session will be both didactic and interactive with audience participation.

Sub-Events

SPSC44A Introduction to Session and Overview of Multiparametric Prostate MRI

Participants
Rajan T. Gupta, MD, Durham, NC (*Presenter*) Consultant, Bayer AG; Speakers Bureau, Bayer AG; Consultant, Invivo Corporation

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSC44B 1.5T vs 3T Imaging: Pros and Cons

Participants
Rajan T. Gupta, MD, Durham, NC (*Presenter*) Consultant, Bayer AG; Speakers Bureau, Bayer AG; Consultant, Invivo Corporation
Francois Cornud, MD, Paris, France (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSC44C Diffusion Weighted Imaging

Participants
Andrew B. Rosenkrantz, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSC44D Dynamic Contrast Enhanced Imaging

Participants
Sadhna Verma, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Honored Educators

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Sadhna Verma, MD - 2013 Honored Educator

SPSC44E Imaging of Recurrence in Prostate Cancer

Participants
Adam Froemming, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSC45

Controversy Session: Current USPSTF Lung Cancer Screening: Inclusive or Exclusive

Wednesday, Dec. 2 4:30PM - 6:00PM Location: S404AB

CH OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ella A. Kazerooni, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

SPSC45A USPSTF Lung Cancer Screening: Pro

Participants
Ella A. Kazerooni, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List the major risk factors for lung cancer. 2) Describe the potential advantages of the inclusivity of USPSTF lung cancer screening eligibility criteria. 3) Understand the spectrum of lung cancer risk among patients meeting the USPSTF criteria. 4) Recognize how personalized risk assessment can facilitate shared decision making for patients meeting USPSTF criteria.

ABSTRACT

1. List the major risk factors for lung cancer.2. Describe the potential advantages of the inclusivity of USPSTF lung cancer screening eligibility criteria.3. Understand the spectrum of lung cancer risk among patients meeting the USPSTF criteria.4. Recognize how personalized risk assessment can facilitate shared decision making for patients meeting USPSTF criteria.

URL

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Ella A. Kazerooni, MD - 2014 Honored Educator

SPSC45B USPSTF Lung Cancer Screening: Con

Participants
Doug Arenberg, Ann Arbor, MI, (darenber@umich.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the rationale for the USPSTF lung cancer screening criteria. 2) Understand the importance of identifying risk among those referred for lung cacner screening. 3) Identify the impact of lung cancer risk on the balance of harms and benefits of lung cancer screening. 4) Describe the clinical and demographic traists that increase one's risk fo rlung cancer.

ABSTRACT

SPSC46

Controversy Session: Ultrasound versus CT for Suspected Renal Colic: Which Modality Rocks in the ER?

Wednesday, Dec. 2 4:30PM - 6:00PM Location: S404CD

GU CT US ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Judy Yee, MD, San Francisco, CA (*Moderator*) Research Grant, EchoPixel, Inc
Mitchell E. Tublin, MD, Pittsburgh, PA (*Presenter*) Nothing to Disclose
Aaron D. Sodickson, MD, PhD, Wayland, MA, (asodickson@bwh.harvard.edu) (*Presenter*) Research Grant, Siemens AG; Consultant, Bracco Group
D. Mark Courtney, MD, MSc, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the advantages of ultrasound and present a cost effective, rational algorithm for its use in the evaluation of ER patients with potential renal colic. 2) Understand the benefits of CT over ultrasound in ER imaging of suspected renal colic. 3) Understand the perspective and preferences of the ER physician for the workup of renal colic and the effect on clinical workflow.

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Aaron D. Sodickson, MD, PhD - 2014 Honored Educator

SPSC50

Controversy Session: Interventional Radiology of the Future: Hoarders or Stewards?

Thursday, Dec. 3 7:15AM - 8:15AM Location: E351

IR ED

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Jeanne M. Laberge, MD, San Francisco, CA (*Moderator*) Consultant, W. L. Gore & Associates, Inc;

LEARNING OBJECTIVES

1) Describe the upcoming changes in IR training mandated by the Accreditation Council for Graduate Medical Education (ACGME). 2) List procedural areas of image-guided intervention that are sometimes performed outside of the IR section proper by radiologists who are not subspecialty trained in Vascular and Interventional Radiology (VIR). 3) Explain what the term "peri-procedural clinical care" means as applied to image-guided interventions. 4) Assess the value of the new IR residency in advancing clinical care. 5) Specify the advantages of retaining image-guided procedural expertise within areas of the Radiology department outside of IR.

ABSTRACT

In September 2014, the Accreditation Council for Graduate Medical Education (ACGME) approved the program requirements for a new training program in Interventional Radiology (IR). The new IR residency will provide training in imaging, image-guided interventions and clinical care. Preparing residents to care for patients before, during and after image-guided procedures, is a major focus of the new program. Physicians may enter training directly from medical school (after completing a clinical internship) or they may enter after completing a residency in Diagnostic Radiology.This new development in IR training may have implications for the practice of image-guided interventions outside of IR. In this course, the moderator will describe the components of the new IR training program. The speakers will explain how this new training paradigm may change the practice of image-guided interventions within the specialty of Interventional Radiology and also outside the field of IR. The potential implications of this change in IR training for the radiology department as a whole will be explored.

Sub-Events

SPSC50A This is IR Authority

Participants
John A. Kaufman, MD, Portland, OR (*Presenter*) Consultant, Bio2 Technologies, Inc; Consultant, Cook Group Incorporated; Consultant, Medtronic, Inc; Consultant, W. L. Gore & Associates, Inc; Consultant, Guerbet SA; Stockholder, Hatch Medical LLC; Stockholder, VuMedi, Inc; Stockholder, Veniti, Inc; Royalties, Reed Elsevier; Advisory Board, Delcath Systems, Inc; Researcher, W. L. Gore & Associates, Inc; Researcher, Guerbet SA; Researcher, BTG International Ltd; Researcher, EKOS Corporation; Stockholder, EndoShape, Inc; Advisory Board, AV Medical; Advisory Board, Javelin Medical

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSC50B 'Not That Straightforward'

Participants
Susan D. John, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPSH50

Hot Topic Session: Dual-energy CT for GU Imaging

Thursday, Dec. 3 7:15AM - 8:15AM Location: E350

GU CT

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Hersh Chandarana, MD, New York, NY (*Moderator*) Equipment support, Siemens AG; Software support, Siemens AG; Consultant, Bayer, AG;

LEARNING OBJECTIVES

1) This course will cover the basics and application of Dual Energy CT in GU Radiology.

ABSTRACT

Sub-Events

SPSH50A Principles of DECT

Participants
Daniel T. Boll, MD, Durham, NC (*Presenter*) Research Grant, Siemens AG; Research Grant, Koninklijke Philips NV; Research Grant, Bracco Group

SPSH50B DECT of GU Masses-2015 Update

Participants
Terri J. Vrtiska, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss DECT advantages for renal mass evaluation. 2) Describe useful DECT applications for renal mass characterization. 3) Summarize recent literature and future opportunities of DECT of renal masses.

ABSTRACT

Application of DECT to renal mass evaluation and improved characterization.

URL

SPSH50C Establishing DECT in Your Practice: Nuts and Bolts

Participants
Avinash R. Kambadakone, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the basic principles, technique and clinical applications of DECT. 2) Identify and appraise the different technologies, workflow implications and challenges of DECT in day-to-day practice. 3) Apply and incorporate the most appropriate DECT protocols into routine practice.

ABSTRACT

URL

MSRT51

ASRT@RSNA 2015: Healthcare in the Developing World... Education is the Key

Thursday, Dec. 3 8:00AM - 9:00AM Location: N230

ED

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Joseph E. Whitton, MS, RT, Stony Brook, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define a variety of challenges to the delivery of healthcare services in remote areas of developing nations. 2) Identify the limited physical resources being currently utilized in rural hospitals in Kenya. 3) Assess the need for standardized procedures and education as a key component to the advancement of healthcare delivery in this region of the world.

ABSTRACT

Description:This presentation will discuss the experience of delivering healthcare as a participant in a medical mission to the remote area of Meru, Kenya. Heathcare providers in this region struggle to meet the challenge of treating as many people as possible with very limited resources. Healthcare professionals from Stony Brook University worked with hospital staff to share methods and procedures to help them in this endeavor. We found that equally important as is the need for material goods is the necessity of education to use and maintain them properly.Outline:I Purpose of the SBU Medical Mission to Kenya Background Connections across the globe Members of the mission team Medical Imaging as new membersII Life in Meru, Kenya Geography and history of the region Cultural Challenges Healthcare delivery challengesIII Consolata Mission Hospital Physical facilities and hospital infrastructure Available technology Limited supplies and resourcesIV What Can We Do to Help? Equipment and supplies Education Standardized procedures Equipment maintenance

MSCN51

Case-based Review of Neuroradiology (An Interactive Session)

Thursday, Dec. 3 8:30AM - 10:00AM Location: S100AB

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Pina C. Sanelli, MD, Manhasset, NY (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Improve basic knowledge and skills relevant to clinical practice. 2) Practice formulating a differential diagnosis for pathologic diseases involving the brain, spine, head and neck. 3) Apply principles of critical thinking to challenging diagnostic imaging cases.

ABSTRACT

The learning objectives are to enable attendees to:1. Improve basic knowledge and skills relevant to clinical practice.2. Practice formulating a differential diagnosis for pathologic diseases involving the brain, spine, head and neck.3. Apply principles of critical thinking to challenging diagnostic imaging cases.

Sub-Events

MSCN51A Adult Brain

Participants
Pamela W. Schaefer, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the key neuroimaging characteristics of various adult cerebral disease entities. 2) Use pertinent imaging features and key clinical factors to formulate a pertinent differential diagnosis for various adult cerebral pathologies. 3) Discuss the utility of various imaging techniques for evaluating various adult cerebral disorders. 4) Review pertinent anatomy as it pertains to common adult cerebral pathologies.

MSCN51B Adult Spine

Participants
Gordon K. Sze, MD, New Haven, CT (*Presenter*) Investigator, Remedy Pharmaceuticals, Inc

LEARNING OBJECTIVES

1) To analyze findings on imaging examinations of the spine. 2) To characterize unusual findings and provide a differential diagnosis.

ABSTRACT

Lesions of the spine and of the spinal cord can be divided into broad categories. Use of an organized approach to the analysis of difficult cases will allow one to refine a differential diagnosis. Cord lesions, in particular, often superficially resemble one another. By exploring and applying the broad categories of diseases that affect the cord, subtle differences can be brought out.

MSCN51C Adult Head and Neck

Participants
Hugh D. Curtin, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To use imaging findings to differentiate head and neck lesions that can occur in similar locations. 2) To identify and evaluate imaging landmarks that determine changes in treatment.

MSCS51

Case-based Review of Musculoskeletal Radiology (An Interactive Session)

Thursday, Dec. 3 8:30AM - 10:00AM Location: S406A

MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Lynne S. Steinbach, MD, San Francisco, CA, (lynne.steinbach@ucsf.edu) (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the application of basic anatomic, pathologic, and physiologic principles to specific disease processes that affect the muscles, shoulder, elbow, wrist and hand. 2) Illustrate using case examples of several important disease processes that affect these regions, using several imaging methods and emphasizing the value of each. 3) Present the major teaching points and differential diagnostic considerations for each of the chosen cases and, when appropriate, clarify the importance of early accurate diagnosis.

ABSTRACT

Accurate diagnosis of many disorders that affect muscles, shoulder, elbow, wrist and hand can be accomplished with basic or advanced imaging methods, or both. A series of cases will be used to illustrate a few of these disorders, with attention to the most appropriate imaging protocol, the salient imaging findings, the anatomic and pathophysiologic factors that explain the findings, and the important differential.

Sub-Events

MSCS51A Muscle

Participants
Andrew J. Grainger, MRCP, FRCR, Leeds, United Kingdom (*Presenter*) Speaker, General Electric Company; Equipment support, Siemens AG;

LEARNING OBJECTIVES

View learning objectives under main course title.

MSCS51B Shoulder

Participants
Jenny T. Bencardino, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Handout:Jenny T. Bencardino

http://abstract.rsna.org/uploads/2015/15002740/Bencardino_Shoulder[1].pdf

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Jenny T. Bencardino, MD - 2014 Honored Educator

MSCS51C Elbow

Participants
Kathryn J. Stevens, MD, Menlo Park, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSCS51D Wrist and Hand

Participants
Leon Lenchik, MD, Winston-Salem, NC, (llenchik@wakehealth.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSES51

Essentials of Non-interpretative Skills

Thursday, Dec. 3 8:30AM - 10:00AM Location: S406B

HP PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

MSES51A How a Dictation Becomes a Dollar

Participants
Ezequiel Silva III, MD, San Antonio, TX, (zekesilva3@gmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Gain an understanding of each step in the payment process including diagnosis and procedural coding, as well as valuation. 2) Apply these concepts to future alternative payment models. 3) Explore financial performance indicators for billing entities and how these indicators are used to evaluate our internal and external billing processes. 4) Discuss questions which these concepts should prompt when pursuing new practice opportunities.

ABSTRACT

The ability to navigate future payment models will require basic knowledge of the manner in which radiology services are paid within current systems. This session will take the participant through every step in the payment process and focus on how each element of the interpretive dictation impacts the payment process. Focus will be given to diagnosis and procedural coding and how that translates to medical necessity and eventual valuation. An introduction to alternative payment models will follow and the session will close with a glimpse at financial performance indicators every radiologists should understand.

Handout:Ezequiel Silva

http://abstract.rsna.org/uploads/2015/15001830/Dictation to Dollar notes.docx

MSES51B Radiologist Value Based Payments: Myth or Reality?

Participants
Giles W. Boland, MD, Boston, MA (*Presenter*) Principal, Radiology Consulting Group; Royalties, Reed Elsevier

LEARNING OBJECTIVES

1) To understand the changing payment landscape and how it could impact radiology revenue streams. Quality, safety and patient experience factors will likely factor into value based payments. This section will focus on the impending transformation that will be likely occur and what strategies radiologists can employ to take advantage.

ABSTRACT

MSES51C Fundamentals of CT Data Acquisition

Participants
Sandra S. Halliburton, PhD, Highland Heights, OH, (sandra.halliburton@philips.com) (*Presenter*) Employee, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Identify the basic hardware components of a CT scanner. 2) Understand the standard methods for acquiring CT data. 3) Describe important user-defined parameters for data acquisition. 4) Select appropriate data acquisition parameters based on patient characteristics and clinical indication.

MSES51D Radiology Malpractice: Pitfalls to Avoid

Participants
Richard Duszak JR, MD, Atlanta, GA, (richard.duszak@emory.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Articulate the four criteria necessary for a successful malpractice lawsuit. 2) Outline factors contributing to a "missed" imaging diagnosis. 3) Describe opportunities to enhance communication with referring physicians and patients so as to improve care and minimize malpractice exposure.

RC601

Contemporary Imaging of Lung Cancer

Thursday, Dec. 3 8:30AM - 10:00AM Location: N227

CH CT MI MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Jeremy J. Erasmus, MD, Houston, TX (*Moderator*) Nothing to Disclose

Sub-Events

RC601A Non-small Cell Lung Cancer Staging: Concepts and Controversies

Participants
Ioannis Vlahos, MRCP, FRCR, London, United Kingdom (*Presenter*) Research Consultant, Siemens AG Research Consultant, General Electric Company

LEARNING OBJECTIVES

1) Summarize the origins, basis and rationale of the current TNM classification of lung cancer. 2) Discuss the strengths and limitations of the current system and how to practically address these 3) Highlight areas where current radiology, oncological, surgical and pathological best practice and evolving knowledge in these area are progressing beyond the current staging system.

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Ioannis Vlahos, MRCP, FRCR - 2015 Honored Educator

RC601B Contemporary Concepts in Small Cell Lung Cancer

Participants
Fergus V. Gleeson, MBBS, Oxford, United Kingdom (*Presenter*) Consultant, Alliance Medical Limited; Consultant, Blue Earth Diagnostics Limited; Consultant, Polarean, Inc;

LEARNING OBJECTIVES

1) To learn the clinical manifestations, staging and prognostic factors of small cell lung cancer. 2) To become familiar with the role of PET-CT in the investigation and management of small cell lung cancer. 3) To review unusual presentations of small cell lung cancer and their investigation and treatment.

ABSTRACT

Small cell lung cancer, SCLC, accounts for approximately 15% of all lung cancers, with its overall incidence decreasing, although it is increasing in women, with the male to female incidence ratio now 1:1. Small cell lung cancer has a more rapid doubling time than non-small cell lung cancer, with most patients presenting with hematogenous metastases, and only approximately one-third presenting with limited-stage disease confined to the chest.Small cell lung cancer uncommonly presents with a solitary pulmonary nodule, and the disease does not appear to have benefited from Lung Cancer Screening. There are multiple neurologic and endocrine paraneoplastic syndromes associated with small cell lung cancer, with marked improvement on treatment of the underlying tumour.Historically SCLC was staged according to the Veteran's Administration Lung Group's 2 stage classification of 1) extensive-stage disease or 2) limited-stage disease, and this classification used to guide therapy. More recently it has been recommended that SCLC is staged according to the International Association of the Study of Lung Cancer (IASLC) and the AJCC Cancer Staging Manual 7th edition, using the same staging system for NSCLC and SCLC.Whilst contrast enhanced CT scan of the chest and abdomen remain routine as the initial method for staging SCLC, FDG PET-CT now plays a more important role in staging and management. SCLC is a highly metabolic disease, and PET-CT both upstages and downstages disease, potentially altering management

RC601C PET Imaging of Lung Cancer: Beyond Standard Metabolic Assessment

Participants
Eric M. Rohren, MD, PhD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review advanced image processing and metabolic parameters in FDG-PET/CT. 2) Discuss non-FDG radiotracers and their potential applications in non-small cell lung cancer. 3) Illustrate the application and clinical use of advanced metabolic imaging biomarkers derived from FDG-PET/CT using case examples.

ABSTRACT

Assessment of non-small cell lung cancer with PET is typically performed using F-18 fluorodeoxyglucose (FDG). The uptake and retention of FDG by the tumor is taken to be a measure of metabolism, which in turn can provide useful information on staging, grading, and prognosis. Advances in the field of PET/CT imaging may provide additional information for the evaluation and care of patients with lung cancer. Advanced semi-quantitative analyses including total lesion glycolysis (TLG) and metabolic tumor volume

(MTV) have been employed to capture additional information from FDG-PET/CT studies, which in some cases is additive to standard metabolic parameters such as SUVmax. New tracers are under development, with some nearing approval in the U.S. and elsewhere. These include tracers targeting proliferation, receptor expression, and protein catabolism, investigating molecular events and processes beyond glucose metabolism.

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Eric M. Rohren, MD, PhD - 2015 Honored Educator

RC601D MRI: Advances in Nodule Characterization and Lung Cancer Staging

Participants
Kyung S. Lee, MD, PhD, Seoul, Korea, Republic Of, (kyungs.lee@samsung.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review most popular MRI techniques that are used in thoracic MR imaging. 2) To demonstrate how effective MR imaging is in nodule characterization and lung cancer staging, particularly focused on diffusion-weighted imaging (DWI) and diffusion-weighted whole-body imaging with background body signal suppression (DWIBS).

ABSTRACT

Diffusion-weighted MR imaging helps characterize lung nodule, and enables staging and prognosis prediction in lung cancer. Diffusion-weighted whole-body imaging with background body signal suppression (DWIBS) is known to be specific in nodal staging and effective in whole body MR imaging. Both whole body MRI and PET-CT may be used in extra-thoracic lung cancer staging, but each modality has its own and different merits in lung cancer staging. Whole body MRI-PET may be the future oncologic imaging modality.

URL

RC601E CT Perfusion Imaging in Lung Cancer

Participants
Friedrich D. Knollmann, MD, PhD, Sacramento, CA, (fknollmann@ucdavis.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To identify suitable indications for the use of CT perfusion imaging in lung cancer. 2) To apply CT perfusion imaging to lung tumors. 3) To recognize important features of a valid CT perfusion imaging protocol. 4) To interpret the results of a CT perfusion study in lung tumors.

ABSTRACT

CT perfusion (CTP) imaging has become a tenable proposition with the advent of multislice CT. Preliminary data have indicated a potential role in the assessment of treatment response in lung cancer, but the method is not widely used. In this course, the rationale for using CT perfusion imaging as a quantitative imaging biomarker in lung cancer is discussed. A review of CT protocols includes factors that have impeded a wider adoption of the method in the clinical sphere, such as the reproducibility of measurements, and validation efforts. Solutions to these problems, such as improved anatomic coverage with wider detectors and table motion, reduced radiation exposure with iterative reconstruction, advanced postprocessing with dual blood supply algorithms, motion registration and correction, and volumetric perfusion analysis are addressed. With these methods, tumor classification, assessment of tumor response, and prognostic testing are promising applications of CTP imaging.

RC601F Thoracic Oncologic Imaging: Treatment Effects and Complications

Participants
Brett W. Carter, MD, Houston, TX (*Presenter*) Author, Reed Elsevier; Consultant, St. Jude Medical, Inc; ;

LEARNING OBJECTIVES

1) Understand the role of imaging in the evaluation of patients who have been treated for thoracic malignancies. 2) Recognize the manifestations of radiation therapy in the chest and be able to differentiate expected changes from residual or recurrent disease. 3) Identify intrathoracic complications from radiation therapy, chemotherapy, and surgery.

ABSTRACT

Imaging plays an important role in the evaluation of patients who have been treated with radiation therapy, chemotherapy, and/or surgery for intrathoracic malignancies such as lung cancer, esophageal cancer, malignant pleural mesothelioma, and thymoma. Following thoracic radiation therapy, radiation pneumonitis (1-6 months following therapy) and radiation fibrosis (6-12 months following therapy) are typically identified in the lungs. However, complications such as esophagitis, esophageal ulceration, and radiation-induced cardiovascular disease may develop. Patients treated with chemotherapy may develop pulmonary and cardiovascular complications such as drug toxicity, organizing pneumonia, thromboembolic disease, vasculitis, and cardiomyopathy. Knowledge of the spectrum of expected treatment-related changes, potential treatment complications and the appearance of tumor recurrence is critical in order to properly monitor patients, identify iatrogenic complications, and avoid misinterpretation.

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Brett W. Carter, MD - 2015 Honored Educator

RC602

PQI Education - How to Do It

Thursday, Dec. 3 8:30AM - 10:00AM Location: S403B

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
David B. Larson, MD, MBA, Los Altos, CA (*Moderator*) Intellectual property license agreement, Bayer AG; Potential royalties, Bayer AG

LEARNING OBJECTIVES

1) Understand basic approaches to teaching practicing radiologists and trainees the core elements of Practice Quality Improvement. 2) Be prepared to set up and run a basic PQI education program for a local radiology department or practice.

ABSTRACT

Completion of Practice Quality Improvement (PQI) projects has now become a requirement of the American Board of Radiology (ABR) Maintenance of Certification program. QI education is also now required by the Accreditation Council for Graduate Medical Education as part of residency training, and QI-related material is now included in the ABR's core, certifying, and recertifying examinations.In this session, the authors will share how they provide didactic and practical training in QI methodology for both practicing radiologists and trainees within their departments.

Sub-Events

RC602A A Team-based, Project-based Improvement Education Program

Participants
David B. Larson, MD, MBA, Los Altos, CA (*Presenter*) Intellectual property license agreement, Bayer AG; Potential royalties, Bayer AG

LEARNING OBJECTIVES

1) Be familiar with major elements of a team-based, project-based quality improvement education program. 2) Understand the major elements required to replicate such a program at one's own institution.

ABSTRACT

We believe that the best way to learn quality improvement is to complete a successful improvement project in a structured mentored environment, in conjunction with a dedicated didactic curriculum.At our institution, we have developed a 20-week course in which multidisciplinary teams solve meaningful problems to signifcantly improve performance in the department. Projects are strongly supported by senior leadership, individuals are assigned specific team roles, knowledgeable coaches are assigned to each team, and education is delivered in a 'flipped classroom' model.

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David B. Larson, MD, MBA - 2014 Honored Educator

RC602B Teaching Quality Improvement Essentials to Future Leaders

Participants
James R. Duncan, MD, PhD, Saint Louis, MO, (duncanj@mir.wustl.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define quality as it relates to key aspects of their daily work. 2) Describe three essential steps common to any data-driven quality improvement initiative. 3) Design a basic curriculum for teaching quality improvement skills.

ABSTRACT

Radiology's future leaders must learn process improvement techniques so that they can better lead frontline teams as they conduct quality/safety improvement projects. With support from the RSNA Research and Education Foundation, we created a Radiology Improvement Leader Training Course. The course is now in its fourth year. It is based on the Institute for Healthcare Improvement's 9 month long Improvement Advisor program. This session will review the design and delivery of that course as well as other strategies for teaching quality improvement techniques.

RC602C Basics of the ABR/ACGME Curriculum for Quality Improvement and Non-interpretative Skills

Participants
Gloria M. Salazar, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the basic elements of Quality Improvement Training for residents required by the ABR. 2) Understand key principles of the CLER pathways to excellence in order to promote physician education in patient quality and safety.

ABSTRACT

In addition to clinical expertise, radiologists will require to have effective knowledge of quality improvement (QI) methods in order to deliver safe and high-quality patient care. The need for QI skills has been emphasized by the American Board of Radiology (ABR) non-interpretative curriculum for residents. In addition, through the Clinical Learning Environment Review (CLER) Pathways to Excellence Program, the ACGME endorses training in QI and patient safety as an integral part of the curriculum to prepare healthcare providers on how to address issues related to quality of care.

RC603

Interpreting Coronary Artery CTA

Thursday, Dec. 3 8:30AM - 10:00AM Location: N228

CA CT IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

ABSTRACT

Sub-Events

RC603A Imaging and Interpreting Re-vascularized Coronary Arteries (I: Bypass Grafts)

Participants
Smita Patel, MBBS, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the basic approach of evaluating coronary artery bypass grafts on CT. 2) To review normal surgical anatomy and pathology of coronary artery bypass graft conduits on CT.

ABSTRACT

RC603B Imaging and Interpreting Re-vascularized Coronary Arteries (II: Stents)

Participants
Marc Dewey, MD, Berlin, Germany (*Presenter*) Research Grant, General Electric Company; Research Grant, Bracco Group; Research Grant, Guerbet SA; Research Grant, Toshiba Corporation; Research Grant, European Commission; Research Grant, German Research Foundation; Speakers Bureau, Toshiba Corporation; Speakers Bureau, Guerbet SA; Speakers Bureau, Bayer AG; Consultant, Guerbet SA; Author, Springer Science+Business Media Deutschland GmbH; Editor, Springer Science+Business Media Deutschland GmbH; Institutional research agreement, Siemens AG; Institutional research agreement, Koninklijke Philips NV; Institutional research agreement, Toshiba Corporation; ; ; ; ; ; ; ; ;

LEARNING OBJECTIVES

1) Review the issues involved in detecting coronary in-stent restenosis by CT angiography. 2) Get an overview of the diagnostic accuracy of CT angiography for coronary stents. 3) Understand the potential advantages of iterative reconstruction and perfusion assessment by CT for stents.

URL

www.herz-kurs.de

RC603C Deciphering Coronary Anomalies and Fistulas

Participants
Jonathan D. Dodd, MD, Dublin 4, Ireland (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the basic classification of coronary anomalies and fistulas. 2) Understand the most clinically important anomalies and fistulas.

RC604

Multimodality Evaluation of Joint Replacements: A Master Class (An Interactive Session)

Thursday, Dec. 3 8:30AM - 10:00AM Location: E353B

MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Theodore T. Miller, MD, New York, NY (*Director*) Nothing to Disclose

Sub-Events

RC604A Hip and Knee

Participants
Theodore T. Miller, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Apply the technique for MR imaging of hip and knee replacements. 2) Recognize and describe the MR appearances of complications related to these joint replacements.

ABSTRACT

MR imaging of hip and knee replacements requires adjustment of scanning parameters, such as using fast spin echo sequences with long echo train length, maximum receiver bandwidth, thin slices, and a high frequency-encoding matrix, to minimize intravoxel dephasing and misregistration artifacts. Proprietary techniques such as MAVRIC (multi-acquisition variable resonance image combination) and SEMAC (slice-encoding metal artifact correction) can also reduce metal-related artifacts. Complications encountered on MR imaging of hip and knee replacements will be discussed, including adverse reactions to metal debris, polymeric wear, infection, osteolysis, component loosening, stress reaction and fracture, and tendon tears.

RC604B Shoulder and Elbow

Participants
Felix S. Chew, MD, Seattle, WA, (fchew@uw.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize and describe the features of shoulder joint replacements on radiologic images. 2) Recognize and describe the features of elbow joint replacements on radiologic images.

ABSTRACT

Shoulder joint replacements include anatomic total joint replacements, humeral head replacements, and reverse total joint replacements. Elbow joint replacements include replacements of the radial head alone, replacements of the radiocapitellar compartment, and replacements of the ulno-trochlear compartment. Knowledge of the expected appearances of each type of postsurgical construct and the range of complications will improve the radiologist's ability to identify complications.

Active Handout:Felix Sze-Kway Chew

http://abstract.rsna.org/uploads/2015/15001714/Active RC604B.pdf

Honored Educators

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Felix S. Chew, MD - 2012 Honored Educator

RC604C Smaller Joints

Participants
Laura W. Bancroft, MD, Orlando, FL, (laura.bancroft.md@flhosp.org) (*Presenter*) Royalties, Wolters Kluwer nv

LEARNING OBJECTIVES

1) Review imaging characteristics of arthroplasties in smaller joints, such as the ankle/foot, hands/feet and elbow. 2) Demonstrate complications of smaller joint arthroplasties with various imaging modalities.

ABSTRACT

This refresher course will encompass the imaging characteristics of arthroplasties in smaller joints, such as the ankle/foot, hands/feet and elbow.The normal appearances and complications of smaller joint arthroplasties will be demonstrated utilizing various imaging modalities.

RC605

Brain Aneurysms

Thursday, Dec. 3 8:30AM - 10:00AM Location: S102AB

NR ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Steven W. Hetts, MD, San Francisco, CA (*Moderator*) Consultant, Silk Road Medical Inc Consultant, Medina Medical Inc Research Grant, Stryker Corporation Data Safety Monitoring Board, Stryker Corporation
Darren Orbach, MD, Boston, MA, (darren.orbach@childrens.harvard.edu) (*Moderator*) Nothing to Disclose

Sub-Events

RC605A Management of the Unruptured Brain Aneurysm

Participants
Robert Fahed, MD, MSc, Quebec, QC (*Presenter*) Nothing to Disclose

Handout:Jean Raymond

http://abstract.rsna.org/uploads/2015/15000018/RAYMONDJ_RC605A_61267.pdf

RC605B Pediatric Arteriopathy: A Neurointerventionalist's Perspective

Participants
Darren Orbach, MD, Boston, MA, (darren.orbach@childrens.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the most common causes of pediatric arterial ischemic stroke. 2) Contextualize arterial ischemic stroke within overall cerebrovascular conditions in children (hemorrhagic and venous). 3) Distinguish between progressive and fixed arteriopathies, in terms of natural history and treatment strategies. 4) Differentiate etiologies and treatment challenges of stroke in children versus adults.

ABSTRACT

RC605C Flow-diversion Technology for Treatment of Cerebral Aneurysms

Participants
Philip M. Meyers, MD, New York, NY, (pmm2002@cumc.columbia.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will understand the design of certain flow-diverters used to treat cerebral aneurysms. 2) The participant will be familiar with the on-label and some off-label application of the most commonly used flow diverters in the United States. 3) The participant will be familiar with common radiographic outcome metrics, imaging markers for clinical success and potential complications.

ABSTRACT

Flow diversion is becoming an increasingly important method to treat cerebral aneurysms, now encompassing nearly 40% of all endovascular treatment procedures for unruptured intracranial aneurysms. In this lecture, the meeting participant will learn about the design and application of flow diversion technologies to the treatment of cerebral aneurysms and about some of the imaging manifestations associated with their use.

RC606

Open Wide! Imaging the Oral Cavity and Jaw

Thursday, Dec. 3 8:30AM - 10:00AM Location: E451B

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC606A Odontogenic and Non-odontogenic Diseases of the Jaw

Participants
Joel K. Cure, MD, Birmingham, AL, (jcure@uabmc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Perform technically optimized CT examinations to evaluate jaw lesions. 2) Identify imaging features that predict an odontogenic vs. non-odontogenic origin of imaged jaw lesions. 3) Stratify a differential diagnosis for jaw lesions by employing principles conveyed in this presentation. 4) Identify cases requiring clinical action.

ABSTRACT

After considering the clinical presentation and patient demographics, a differential diagnosis for imaged jaw lesions is facilitated by optimized imaging and identification of features that predict an odontogenic vs. non-odontogenic lesion origin and that predict lesion behavior. Location of the lesion in tooth-bearing vs. non-tooth-bearing portions of the jaw, the spatial relationship of the lesion to individual teeth, and the condition of the affected/involved dentition are all noteworthy features. Analysis of lesion attenuation, margins, growth patterns, and soft tissue components can help discriminate similar-appearing lesions and inform patient management.

RC606B Benign Oral Cavity Disease

Participants
Kristen L. Baugnon, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Differentiate the spaces of the oral cavity and develop a differential diagnosis for lesions arising in those locations. 2) Identify some of the most frequently encountered benign lesions in the oral cavity, including anatomic variant, infectious/inflammatory, developmental, and benign neoplastic lesions. 3) Recommend optimal imaging techniques for detection of oral cavity pathology.

ABSTRACT

Benign lesions in the oral cavity can often be detected incidentally on imaging, and can present a diagnostic challenge. The imaging findings of the most frequently encountered benign lesions in the oral cavity are depicted, including anatomic variants, infectious/inflammatory, developmental, and benign neoplastic lesions. The spaces of the oral cavity, including the root of the tongue, sublingual space, and submandibular space are reviewed, and a systematic approach to assessing lesions occurring in these locations is presented. CT and MRI imaging techniques and pitfalls in imaging the oral cavity are discussed.

Active Handout:Kristen Lloyd Baugnon

http://abstract.rsna.org/uploads/2015/15001973/RC606B Benign oral cavity disease.KLB.handout.updated.pdf

RC606C Malignant Oral Cavity Disease

Participants
Kristine M. Mosier, DMD, PhD, Indianapolis, IN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To be familiar with the most common malignant neoplasms of the oral cavity and the key elements for differential diagnosis. 2) To understand staging of oral cavity cancer and be familiar with the critical elements for accurate staging.

ABSTRACT

In this session we will review the most common oral cavity malignant neoplasms with practice pearls to help guide the differential diagnoses of these lesions, as well as less common lesions. We will review current staging for oral cavity cancer and identify those key anatomical features critical to staging. Finally we will review spread patterns for oral cavity cancer.

RC607

A Case-based Audience Participation Session (Genitourinary) (An Interactive Session)

Thursday, Dec. 3 8:30AM - 10:00AM Location: E352

GU

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Paul J. Chang, MD, Chicago, IL, (pchang@radiology.bsd.uchicago.edu) (*Coordinator*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Medical Advisory Board, lifeIMAGE Inc; Medical Advisory Board, Merge Healthcare Incorporated
William W. Mayo-Smith, MD, Boston, MA (*Presenter*) Author with royalties, Reed Elsevier; Author with royalties, Cambridge University Press
Andrea G. Rockall, MRCP, FRCR, London, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will be introduced to a series of Genitourinary case studies via an interactive team game approach designed to encourage "active" consumption of educational content. 2) The participant will be able to use their mobile wireless device (tablet, phone, laptop) to electronically respond to various Genitourinary case challenges; participants will be able to monitor their individual and team performance in real time. 3) The attendee will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

ABSTRACT

The extremely popular audience participation educational experience is back! :GU Diagnosis Live is an expert-moderated session featuring a series of interactive Genitourinary case studies that will challenge radiologists' diagnostic skills and knowledge. Building on last year's successful Diagnosis Live premiere, GU Diagnosis Live is a lively, fast-paced game format: participants will be automatically assigned to teams who will then use their personal mobile devices to test their knowledge of GU radiology in a fast-paced session that will be both educational and entertaining. After the session, attendees will receive a personalized self-assessment report via email that will revview the case material presented durinig the session, along with individual and team performance. :

RC608

Emergency Radiology Series: Contemporary Topics in Imaging of Trauma

Thursday, Dec. 3 8:30AM - 12:00PM Location: S405AB

CT ER

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

Participants
Scott D. Steenburg, MD, Zionsville, IN, (ssteenbu@iuhealth.org) (*Moderator*) Nothing to Disclose
Savvas Nicolaou, MD, Vancouver, BC (*Moderator*) Institutional research agreement, Siemens AG
Martin L. Gunn, MBChB, Seattle, WA, (marting@uw.edu) (*Moderator*) Research support, Koninklijke Philips NV; Spouse, Consultant, Wolters Kluwer NV; Medical Advisor, TransformativeMed, Inc;

Sub-Events

RC608-01 Current Issues in Trauma CT Protocols

Thursday, Dec. 3 8:30AM - 8:55AM Location: S405AB

Participants
Martin L. Gunn, MBChB, Seattle, WA, (marting@uw.edu) (*Presenter*) Research support, Koninklijke Philips NV; Spouse, Consultant, Wolters Kluwer NV; Medical Advisor, TransformativeMed, Inc;

LEARNING OBJECTIVES

1) Summarize challenges that are encountered when performing trauma CT in the ED. 2) Identify tradeoffs that are encountered when deciding 'who' to scan and 'how' to scan. 3) Understand CT techniques that can be used to optimize radiation dose, contrast use, workflow, and injury detection.

ABSTRACT

RC608-02 Is There Any Prognostic Biomarker of Computed Tomography (CT) Images in Patients with Blunt Trauma?: A Single Trauma Center's Experience

Thursday, Dec. 3 8:55AM - 9:05AM Location: S405AB

Participants
Yasutaka Baba, MD, Hiroshima, Japan (*Presenter*) Nothing to Disclose
Masaki Ishikawa, MD, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Kenji Kajiwara, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Wataru Fukumoto, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazuo Awai, MD, Hiroshima, Japan (*Abstract Co-Author*) Research Grant, Toshiba Corporation; Research Grant, Hitachi, Ltd; Research Grant, Bayer AG; Reseach Grant, DAIICHI SANKYO Group; Medical Advisor, DAIICHI SANKYO Group; Research Grant, Eisai Co, Ltd; Research Grant, Nemoto-Kyourindo; ; ; ; ;

PURPOSE

To investigate the prognostic biomarker of CT images in patients with blunt trauma.

METHOD AND MATERIALS

From April 2014 to March 2015, 1077 patients (pts) were admitted to ER (emergency room) unit of our hospital. Among them, total 89 traumatized patients (male 58 pts, female 31 pts, average age 57.6 year-old) who underwent biphasic contrast enhanced CT were enrolled in this study. The causes of trauma were motor vehicle accident (MVA) in 52 pts, fallen accident in 26 pts, stab wound in 3 pts, and others in 8 pts. Radiological and surgical interventional treatments were performed in 10 pts and in 42 pts, respectively. Patient's status, laboratory data, blunt trauma associated score and CT signs as prognostic biomarker were statistically correlated with the mortality.

RESULTS

Among the patient's status, laboratory data, blunt trauma associated score, there was a statistically significant correlation between the mortality and low maximal blood pressure ($p=0.0041$), tachycardia ($p=0.0236$), low sPO2 ($p<0.0001$), low scores of GCS (Glasgow Coma Scale) ($p=0.0014$), high scores of injury severity score (ISS) ($p <0.0001$), low serum hemoglobin level ($p=0.0254$), base excess ($p=0.0002$), and chest blunt trauma ($p=0.0155$). Meanwhile, among the CT signs as prognostic biomarker, there was a statistically significant correlation between the mortality and the intense adrenal enhancement (IAE) at early phase ($p<0.0001$), the flattening of the inferior vena cava (FIVC) ($p=0.0016$) and the shock bowel ($p=0.0058$).

CONCLUSION

It is important to recognize not only the patient's derived information but also the IAE, FIVC and shock bowel as predictive biomarker on biphasic CT images in patients with blunt trauma because the early intervention is required.

CLINICAL RELEVANCE/APPLICATION

Biphasic CT images could provide the information of critically ill patients with blunt trauma and lead us to share decision-making in the treatment.

RC608-03 Pelvic Angiography Project ASER (PAPA) Study - A Retrospective Multicenter Cohort Study of Blunt Pelvic Trauma Patients Who Undergo Catheter Angiography

Thursday, Dec. 3 9:05AM - 9:15AM Location: S405AB

Participants
Ken F. Linnau, MD, MS, Seattle, WA (*Presenter*) Speaker, Siemens AG; Royalties, Cambridge University Press;
Bharti Khurana, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Daniel S. Hippe, MS, Seattle, WA (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV; Research Grant, General Electric Company
Kellie L. Sheehan, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Jorge A. Soto, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
David Dreizin, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Matthew T. Heller, MD, Pittsburgh, PA (*Abstract Co-Author*) Consultant, Reed Elsevier; Author, Reedl Elsevier
Keith D. Herr, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Scott D. Steenburg, MD, Zionsville, IN (*Abstract Co-Author*) Nothing to Disclose
Tarek N. Hanna, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
David J. Nickels, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Hani H. Abujudeh, MD, MBA, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Savvas Nicolaou, MD, Vancouver, BC (*Abstract Co-Author*) Institutional research agreement, Siemens AG
Christina A. LeBedis, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Ludo F. Beenen, MD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess triage pathways and imaging findings in blunt pelvic trauma patients who underwent catheter angiography and establish practice pattern variation and effectiveness of CECT.

METHOD AND MATERIALS

This retrospective multicenter cohort study from 12 level-1-trauma centers in the United States, Canada and Europe included victims of blunt trauma with pelvic fracture and subsequent conventional catheter angiography for treatment of arterial bleeding. Patient data including demographics, clinical and imaging variables prior to angiography was abstracted at each center and sent to a central data repository. Triage algorithms and imaging protocols of each participating center were obtained through a web-based survey. Descriptive, univariate and multivariate analysis was performed. Mixed-effects multivariate logistic regression analysis which accounted for site heterogeneity was performed.

RESULTS

813 patients (37% women, median age 50 yrs, 24% > 65 yrs, 25% transfers) from 2009 to 2013 were included. The median Injury Severity Score (ISS) was 34 with most injuries due to motor vehicles. Overall, 61 (7.5 %) patients died within 24 hrs of admission. Imaging work-up varied with 3 of 12 centers always performing CECT prior to conventional angiography. Pelvic radiographs were obtained in 88% patients and 62% had FAST during initial resuscitation. CECT was obtained in 77% of patients before angiography. ISS was significantly higher in those who had no CECT (39 vs 33). Door-to-angio time was 3.8 hrs. Overall, 69% of patients had catheter angiographic findings of any arterial injury, 55% had active contrast extravasation. The positive angio rate was 67% if CECT was obtained and 76% if no CECT was done before angiography (p = 0.024). Site-adjusted multivariate logistic regression accounting for laparotomy, pelvic binder, pelvic packing, any transfusions, HR >120, hematocrit revealed an odds ratio for positive angiography of 0.83 (CI: 0.53-1.31, p= 0.42) if CECT was obtained.

CONCLUSION

Although CECT is widely utilized, the rate of arterial vascular injury on conventional catheter angiography is not substantially different in blunt pelvic trauma patients who do not get CECT before intervention.

CLINICAL RELEVANCE/APPLICATION

Although catheter angiography is recommended in hemodynamically unstable patients with pelvic fractures, it remains unclear if contrast-enhanced computed tomography (CECT) aids in triage of such patients to angiography.

Honored Educators

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Bharti Khurana, MD - 2014 Honored Educator
Jorge A. Soto, MD - 2013 Honored Educator
Jorge A. Soto, MD - 2014 Honored Educator
Jorge A. Soto, MD - 2015 Honored Educator

RC608-04 CT of Neck Injuries

Thursday, Dec. 3 9:15AM - 9:40AM Location: S405AB

Participants
Clint W. Sliker, MD, Ellicott City, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the imaging appearances of injuries to a number of important neck structures other than the spine and cerebrovasculature, including the larynx, pharynx, trachea, esophagus, and external carotid artery branches. 2) Understand the limitations and pitfalls of CT when used to diagnose injuries to these structures.

ABSTRACT

Active Handout:Clint W. Sliker

http://abstract.rsna.org/uploads/2015/15003328/RC608-04.pdf

RC608-05 Immediate Total-body CT Scanning versus Conventional Imaging and Selective CT Scanning in Severe Trauma Patients: A Randomised Controlled Trial (REACT-2 Trial)

Thursday, Dec. 3 9:40AM - 9:50AM Location: S405AB

Participants
Joanne C. Sierink, MD,PhD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Kaij Treskes, MD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Ludo F. Beenen, MD, Amsterdam, Netherlands (*Presenter*) Nothing to Disclose
Joachim Hohmann, MD, DIPLPHYS, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Michael J. Edwards, MD,PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Benn J. Beuker, MD,PhD, Groningen, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Dennis den Hartog, MD, Rotterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Marcel Dijkgraaf, PHD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Jan S. Luitse, MD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Markus W. Hollmann, MD,PhD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Carel Goslings, MD, PhD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Recent literature suggests a survival benefit for trauma patients when they are evaluated with total-body Computed Tomography (TBCT) scanning during the initial trauma evaluation. Since level-1 evidence is lacking this study aimed to assess the value of immediate total-body CT scanning in severely injured trauma patients.

METHOD AND MATERIALS

In this multicentre clinical trial, we randomly assigned 541 trauma patients to immediate TBCT scanning and 542 patients to the standard workup with conventional imaging supplemented with selective CT scanning. Trauma patients having compromised vital parameters, clinical suspicion of life-threatening injuries or severe injury mechanisms were eligible. The primary endpoint was inhospital mortality. Secondary endpoints were clinically relevant time intervals, radiation exposure, missed injuries and direct medical costs.

RESULTS

The in-hospital mortality rate was not statistically different between groups (TBCT 15.9% vs. standard 15.7%, P=0.923). Subgroup analyses in polytrauma patients also did not reveal a significant difference between groups (TBCT 22.4% vs. standard 24.8%, P=0·457). Imaging time in the trauma room was decreased in the TBCT group (30 min vs. 37 min, P<0.001). More patients in the standard workup group received a lower effective radiation dose during the total hospital stay (21.0mSv [IQR=20.9-25.2] versus 20.6mSv [IQR=11.8-27.6], P<0.001). The number of missed injuries found during the tertiary survey were not different between groups (45 [8.8%] vs. 53 [10.1%], P=0.448). The medical costs were €24,967 (95% CI: €21,880- €28,752) for the TBCT group and €26,995 (95% CI: €23,326-€30,908) for the standard workup group (P=0.439).

CONCLUSION

Total-body CT scanning was safe, shortened the imaging time and did not increase the medical costs, but it did not improve survival, and most patients in the standard workup group received a lower radiation dose.

CLINICAL RELEVANCE/APPLICATION

Total-body Computed Tomography can be used for evaluation in trauma as it is safe and fast. Further research should focus on improvement of selection of trauma patients for evaluation by TBCT scanning.

RC608-06 Utility of MDCT Findings in Predicting Patient Management Outcomes in Renal Trauma

Thursday, Dec. 3 9:50AM - 10:00AM Location: S405AB

Participants
Arthur Baghdanian, MD, Boston, MA (*Presenter*) Nothing to Disclose
Armonde Baghdanian, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Anthony S. Armetta, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Christina A. LeBedis, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Jorge A. Soto, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Stephan W. Anderson, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the utility of MDCT findings in predicting clinical outcomes in renal trauma.

METHOD AND MATERIALS

This retrospective study was IRB approved and HIPAA compliant; informed consent was waived. Adult patients suffering from blunt or penetrating renal trauma from 01/01/2006 to 12/31/2013 were included. During this interval, 162 patients met this inclusion criteria (males, n=121; females, n=41; mean age = 33 years-old, range 15-88 years; blunt trauma, n=114; penetrating trauma, n=48). Renal injury was graded based on the AAST kidney injury scale. Additional variables that were blind read from abdominopelvic CT studies as well as recorded from the EMR included: active extravasation, collecting system injury, embolization, collecting system stenting and surgical management.Fisher's exact test was used to evaluate the association between: active extravasation and operative or endovascular therapy; AAST score and operative or endovascular therapy; and AAST score and collecting system stenting.

RESULTS

AAST kidney injury score: grade 1 (n=26), grade 2 (n=33), grade 3 (n=61), grade 4 (n=37), and grade 5 (n=5). Active extravasation (n=25) and collecting system injury (n=20).13/162 (8%) patients received further management related to renal trauma. 2 patients (1%) required renal artery embolization. 11 patients underwent surgery: nephrectomy (n=2; 1%), renorrhaphy (n=3; 2%), and collecting system stent (n=6; 3.7%).7/25 patients (13/25 grade 3/4; 12/25 grade 1/2/3) with active extravasation received surgical management or embolization. There was a statistically significant correlation between active extravasation and

surgical or endovascular therapy (p<0.001). There was a statistically significant correlation between high grade injury (grade 4/5) with both active extravasation (p=0.002) and collecting system stenting (p<0.001). Finally, there was no statistically significant correlation between high vs low grade of injury with surgical or endovascular management (p=0.07).

CONCLUSION

Active extravasation is a significant predictor of surgical or endovascular management of renal trauma. The AAST grade does not correlate with the need for surgical or endovascular management, however, it does correlate with collecting system injury and intervention.

CLINICAL RELEVANCE/APPLICATION

An imaging based renal trauma scoring system that incorporates active extravasation may be necessary to more accurately predict patient outcomes.

Honored Educators

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Jorge A. Soto, MD - 2013 Honored Educator
Jorge A. Soto, MD - 2014 Honored Educator
Jorge A. Soto, MD - 2015 Honored Educator

RC608-07 Question and Answer

Thursday, Dec. 3 10:00AM - 10:15AM Location: S405AB

Participants

RC608-08 Imaging of Thoracic Trauma

Thursday, Dec. 3 10:15AM - 10:40AM Location: S405AB

Participants
Constantine A. Raptis, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review key imaging findings which need to be identified on the trauma chest radiograph. 2) Discuss indications for thoracic CT imaging in trauma patients. 3) Introduce an organized approach to the chest CT in thoracic trauma. 4) Identify and understand important findings which are commonly seen on chest CT examinations in trauma.

ABSTRACT

RC608-09 'Time to Revisit Major Trauma Imaging Approach?': Lung Ultrasound-FAST (LUS-FAST) Plus WB-MDCT in Pneumothorax Diagnosis

Thursday, Dec. 3 10:40AM - 10:50AM Location: S405AB

Participants
Stefania Ianniello, Roma, Italy (*Presenter*) Nothing to Disclose
Michele Galluzzo, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Barbara Sessa, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Claudio Ajmone Cat, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Giuseppe Nardi, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Vittorio Miele, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

In Major Trauma (ISS - Injury Severity Score >=15), imaging approach of A.T.L.S. take into account supine- CXR for pneumothorax detection, during Primary Survey that have shown low accuracy in the assessment of pneumothorax while it's clearly demonstrated the superiority of lung ultrasound for this diagnosis.The aim of our study was to evaluate the clinical impact for pneumothorax diagnosis of new Imaging approach in a Trauma dedicated logistical context (Shock Room, CT Room, Operating Room strictly closed; Emergency Radiologist 24h/7days): only extended (to thorax)-focused assessment with sonography in trauma (e-FAST), during Primary Survey, and Whole-Body Multidetector Computed Tomography (MDCT) as secondary, during two years of experience in our Level I Trauma Center.

METHOD AND MATERIALS

This was a retrospective case-series study involving 660 consecutive adult patients admitted to the our Emergency Department (422men and 238women) (average age: 41y- age range: 18-81y) between January 2013-December 2014 for a Major Trauma . We evaluated the accuracy of lung ultrasonography in the detection of pneumothorax (compared with the results of Multidetector Computed Tomography (MDCT) and of invasive interventions (thoracostomy tube placement), and timing of this imaging approach.

RESULTS

Among the 1320 lung fields included in the study, we observed 264 pneumothoraces with thoracic MDCT scans. The e-FAST detected 242 pneumothaces and didn't recognize 22 pneumothoraces.About 2 years, total diagnostic performance of L.USwas: sensitivity 92% , specificity 100% , PPV 100 %, NPV 98%, Accuracy 98% At Major Trauma's arrival, median time to achieve pneumothorax diagnosis with Extended was 3 min. (1-5').These results demonstrate that(e-FAST+ WB-MDCThas good results, reduces time (e-FAST within 5'; WB-MDCT within 40') and effectively omits many diagnostic steps between clinical suspicion and definitive proof of injuries that require immediate therapeutic attention. Beyond pneumothorax diagnosis, further studies will occur to analize clinical impact for every single others traumatic lesions.

CONCLUSION

This new Imaging approach,Lung Ultrasound-FASTduring primary survey, and WB-MDCT as secondary, demonstrate high accuracy to achieve avoidable pneumothorax's death; CT scanner should be placed very close to, or in the trauma room; Emergency Radiologist available 24h/7d.

CLINICAL RELEVANCE/APPLICATION

A new powerful Ultrasound field: pneumothorax diagnosis.

RC608-10 Value of Contrast Enhanced CT in Detecting Blunt Traumatic Injury of the Diaphragm: Retrospective Review

Thursday, Dec. 3 10:50AM - 11:00AM Location: S405AB

Participants
Daniel Lamus, MD, San Antonio, TX (*Presenter*) Nothing to Disclose
Carlos S. Restrepo, MD, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Brian Eastridge, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Abdul Alarhayem, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Retrospectively review the accuracy of MDCT for the detection of acute blunt traumatic injury of the diaphragm. Identify the most relevant imaging signs of diaphragmatic injury.

METHOD AND MATERIALS

A waiver for informed consent was granted by the institutional review board. We retrospectively reviewed the records of all patients admitted to our Level I trauma center with intraoperative findings of diaphragmatic injury between 2005 and 2015. Our study was limited to the patients with blunt trauma and a total of 57 patients met this criteria. A group of 10 patients were excluded from the analysis, since diagnosis was made with the initial AP chest radiograph or with the scout view and therefore underwent corrective surgery before being scanned. An additional patient was excluded given that imaging studies were not available.

RESULTS

The diagnosis of diaphragmatic injury was confirmed by using the intraoperative findings as the reference standard. Review of the official radiologic interpretation at the time of admission, yielded a sensitivity of 71%($p<0.005$). A secondary assessment of the available images was also conducted, including a systematic evaluation for the presence of alternative signs of diaphragmatic injury that have been previously described by others. This approach resulted in an increased sensitivity of 93%($p<0.005$). Multivariate analysis including laterality of the injury was also included to complement the statistical analysis.

CONCLUSION

To our knowledge this is the largest series of blunt diaphragmatic injury in the English literature. Left sided injuries are more evident and usually present as herniation while diaphragmatic thickening/hematoma was highly specific of right sided injuries. MDCT is an useful tool in the detection of blunt diaphragmatic injuries; the use of a systematic approach may increase its accuracy.

CLINICAL RELEVANCE/APPLICATION

The widespread use of MDCT in the evaluation of patients with major trauma has improved the detection and characterization of injuries to most organs and structures. In spite of the technologic advances, the detection of diaphragmatic injury remains a diagnostic challenge in the setting of acute trauma. Ischemia to the bowel and other structures has being described as early as 24 hours after the initial injury, hence in the era of nonoperative management of abdominal trauma, timely diagnosis and operative repair of diaphragmatic injury is crucial to avoid complications.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Carlos S. Restrepo, MD - 2012 Honored Educator
Carlos S. Restrepo, MD - 2014 Honored Educator

RC608-11 Hepatic Injuries

Thursday, Dec. 3 11:00AM - 11:25AM Location: S405AB

Participants
Kathirkamanathan Shanmuganathan, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Demonstrate the spectrum of traumatic liver injury. 2) Dicuss the performance and utility of late arterial and portal venous phase images. 3) Discuss the relavence of the various CT finding to management.

RC608-12 Blunt Bowel and Mesenteric Injury: Can We Grade It? Yes We Can!

Thursday, Dec. 3 11:25AM - 11:35AM Location: S405AB

Participants
Andres R. Ayoob, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
James T. Lee, MD, Lexington, KY (*Presenter*) Nothing to Disclose

Gustav A. Blomquist, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
David J. Nickels, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Phillip Chang, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

CT grading of traumatic solid organ injuries is well established. A grading scale based on CT findings for blunt bowel or mesenteric injuries does not exist [2,3]. With the advent of high speed, multi-detector CT we hypothesize that blunt bowel and mesenteric injuries requiring operative intervention can be graded by CT imaging.

METHOD AND MATERIALS

IRB approved, retrospective review of our level-I ACS verified trauma center database of patients with blunt trauma that had both a multi-detector CT scan and laparotomy from 1/2010 to 9/2011 were included. A single trauma surgeon reviewed operative reports and determined the primary outcome of bowel/mesenteric injury requiring surgical intervention (IRSI). The first 20 patients with IRSI were randomly matched to 20 patients during the same study period without IRSI. 3 emergency radiology attendings were blinded and reviewed all 40 subjects'. They scored based on the scoring system developed internally. After initial individual reading session, a consensus reading session was performed on discrepant scoring. Receiver operating characteristic (ROC) curves and sensitivity/specificity analyses were performed on the scores relative to IRSI.

RESULTS

The 2 groups were matched by age, sex, injury severity score (ISS), and timing of presentation to scan and eventual operation (standardized differences < .10). No individual radiologist's scores reached both sensitivity and specificity ≥ 75% relative to IRSI. AUROCs showed "good" (>.6) to "very good" (>.8) discrimination of IRSI. The consensus score AUROC of .799 is good, with .800 considered very good discrimination of the need for surgical intervention (Figure 1). The consensus score of all three radiologists of a ≥ Grade 3 injury was sensitive (75%) and specific at (79%) for the need for surgical intervention. Risk for surgical intervention increased linearly with consensus score. (R2 = .965) (Figure 2).

CONCLUSION

The proposed grading system demonstrates proof of concept in becoming a diagnostic tool in the management of blunt bowel and mesenteric IRSI injuries. The scale provides significant information regarding the extent of injury, need for surgery with diagnostic significance in the very first iteration of this application. Further studies are needed to validate the grading scale.

CLINICAL RELEVANCE/APPLICATION

CT grading scale for bowel and mesenteric injury is possible and may improve communication between radiologist and surgeon.

RC608-13 Inter-reader Agreement in the Detection and Classification of Pancreatic Trauma Injury on CT Using AAST Pancreatic Injury Scoring System

Thursday, Dec. 3 11:35AM - 11:45AM Location: S405AB

Participants
Marta E. Heilbrun, MD, Salt Lake City, UT (*Presenter*) Nothing to Disclose
Nickolas Byrge, MD, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose
Daniel N. Sommers, MD, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose
Nicole S. Winkler, MD, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose
Raminder Nirula, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Pancreatic injuries occur in 1-5% of blunt and penetrating trauma. Mortality may be as high as 20%, often relates to the presence of other injuries, and increases with delayed diagnosis. The sensitivity of CT ranges from 65-91%. Up to 40% of patients may show no abnormality of the pancreas on initial CT and extent of injury may be difficult to characterize. Assessment of pancreatic duct integrity is critical since disruption causes most complications. The 5-point American Association for the Surgery of Trauma (AAST) pancreas injury scale is an accepted scoring system. Intervention may be necessary if AAST>=3. The goal of this study is to determine if there is reader agreement on the presence of pancreatic injury and the extent of injury based on AAST scores on initial trauma CT.

METHOD AND MATERIALS

102 CTs from an multi-institutional AAST de-identified trauma database were reviewed by 3 fellowship trained abdominal radiologists after an initial training. Training was completed after agreement >0.6 (25 studies). Blinded to clinical information and eachother, the readers assigned a binary score (Y/N) to the presence of pancreatic injury, pancreatic duct injury, a 4 point Likert item scale for confidence in injury scores and AAST score. Interrater reliability is assessed with the intraclass correlation coefficient.

RESULTS

The binary assessment of any pancreatic injury ranged from 80-93% for the 3 readers, with interrater agreement of 0.37(95%CI,0.25-0.50) and confidence of assessment 0.53(95%CI,0.40-0.64). The binary assessment of any ductal injury ranged from 31-39% with interrater agreement of 0.65(95%CI,0.52-0.75) and confidence of 0.70(95%CI,0.60-0.78). Mean AAST score ranged from 1.8-2.4. Interrater agreement for AAST score is 0.69(95%CI,0.58-0.77). The greatest disagreement related to the absence of any pancreatic injury, with 2 readers giving 21 studies no injury, but 1 reader giving 7 studies no injury.

CONCLUSION

Even with training, there was relatively poor agreement when there is no or minimal pancreas injury. There is better agreement when there is more extensive injury, especially suspected duct injury. Readers demonstrate good agreement when using the AAST injury score.

CLINICAL RELEVANCE/APPLICATION

Clinically actionable pancreatic trauma (ductal injury) is reliably recognizable on CT. The use of surgical scoring systems, such as the AAST pancreatic injury score, improves reader agreement.

RC608-14 Question and Answer

Thursday, Dec. 3 11:45AM - 12:00PM Location: S405AB

Participants

RC609

Liver Lesions

Thursday, Dec. 3 8:30AM - 10:00AM Location: E353C

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC609A Hypervascular Liver Lesions in non-Cirrhotic Patients

Participants
David J. Grand, MD, Providence, RI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Confidently diagnose liver lesions that meet imaging criteria as definitively benign. 2) Describe the use of hepatocyte-specific contrast agents and their role in evaluation of hypervascular liver lesions. 3) Provide a differential diagnosis for hypervascular lesions which are not definitively benign and recommend further imaging or biopsy as appropriate.

RC609B Dealing with Liver Incidentalomas

Participants
Rajan T. Gupta, MD, Durham, NC, (rajan.gupta@duke.edu) (*Presenter*) Consultant, Bayer AG; Speakers Bureau, Bayer AG; Consultant, Invivo Corporation

LEARNING OBJECTIVES

1) The goal of this course is to familiarize the audience with recent work on dealing with liver incidentalomas including recommendations from the ACR white paper on the topic. Case examples with management guidelines will be shown to demonstrate the key elements of these papers.

RC609C HCC - Typical and Atypical

Participants
Choon H. Thng, MBBS, Singapore, Singapore, (thng.choon.hua@singhealth.com.sg) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify typical appearances of HCC on CT and MRI. 2) Describe and apply criteria from AASLD consensus conference for imaging-based diagnosis of HCC. 3) Identify atypical appearances of HCC and recommend appropriate additional diagnostic procedures for these lesions.

ABSTRACT

Hepatocellular carcinoma (HCC) commonly occurs in cirrhotic lliver and has typical appearances of arterial enhancement and wash-out in the delayed phase. Consensus conferences such as the American Association for Study of Liver Diseases (AASLD) have set up diagnostic criteria based on these typical appearances, for which an imaging-based diagnosis of HCC can be made. However, the appearances of HCC can be atypical when the above findings are less obvious. Arterial hypervascularity can be inferred when a lesion enhances from hypointensity in the pre contrast phase to isointensity in the arterial phase. Subtle arterial hypervascularity and wash-out can also be inferred by comparing changes in signal intensity and Hounsfield readings of the lesion as well as the background liver. The presence of fibrous septa, mosaic pattern, and nodule-in-nodule architecture are suggestive of HCC. Organic anionic transporting polypeptide (OATP) expression declines during the carcinogenesis process and hepatocyte specific contrast allows early detection of HCC nodules which have yet to show the typical patterns. Moderate T2 hyperintensity and restricted diffusion favor the diagnosis of malignancy but are not specific for HCC. They are useful in suggesting the possibility of HCC when observed in the appropriate context of gadolinium enhanced or hepatocyte specific contrast enhanced MR studies. HCC can rarely present in atypical forms for which a diagnosis cannot be made without histology. Understanding the typical and atypical appearances of HCC allow the radiologist to actively participate in the management of the patient.

RC609D Imaging after Liver-directed Therapy

Participants
Steven S. Raman, MD, Santa Monica, CA (*Presenter*) Nothing to Disclose

RC610

Ultrasound Contrast (An Interactive Session)

Thursday, Dec. 3 8:30AM - 10:00AM Location: S402AB

GI GU US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

Sub-Events

RC610A Renal Masses

Participants
Edward G. Grant, MD, Los Angeles, CA (*Presenter*) Research Grant, General Electric Company ; Medical Advisory Board, Nuance Communications, Inc

LEARNING OBJECTIVES

1) Understand the indications for the use of contrast enhanced ultrasound in renal masses. 2) Be familiar with the advantages and disadvantages of contrast enhanced ultrasound in comparison to other forms of cross sectional imaging with regard to its application to renal masses. 3) Be able to analyze contrast enhanced ultrasound images of the kidney. 4) Understand the basics of quantitative contrast imaging of renal masses.

ABSTRACT

Contrast enhanced ultrasound (CEUS) has numerous applications in the imaging of renal masses. It has the particular advantage in this population of being able to be used in patients with renal failure which is not the case with either CT or MRI. Obviously CEUS does not use ionizing radiation and is less expensive than other techniques. A further advantage is the fact that ultrasound is a real time technique and vascular characteristics of lesions can be evaluated throughout the examination. Applications of CEUS in the kidney include imaging of complex cysts (flow in wall, septae etc.) and evaluation of pseudolesions (column of Bertin, infarct, scars). It can also be used to further characterize indeterminate masses on CT/MR and may be able to classify some lesions as benign versus malignant, or suggest their actual histology. The diagnostic capability of CEUS is facilitated by its ability to provide quantitative information. Given the lack of ionizing radiation and absence of nephrotoxicity CEUS is ideal for patients undergoing active surveillance of a renal mass or post resection/RFA.The evaluation of complex renal cysts is one of the most common indications for CEUS. Observed features at CEUS are typically similar to those of the Bosniak classification and this has now been adapted for use with ultrasound contrast. In solid renal masses CEUS may provide information that can help determine the nature of the mass and its anatomy as well as the number of individual lesions. This is particularly valuable in patients in whom other contrast agents are contraindicated. One notable example is the characteristic enhancement pattern of papillary versus clear cell renal cell carcinoma. The former typically enhances less than the surrounding parenchyma throughout the examination while the latter dramatically hyperenhances in the arterial phase. Again, quantitative imaging can further add to the confidence of the diagnosis in such cases.

RC610B Contrast Ultrasound of the Liver and Gallbladder

Participants
Hans-Peter Weskott, MD, Hannover, Germany, (weskotthp@t-online.de) (*Presenter*) Luminary, General Electric Company; Speaker, Bracco Group

LEARNING OBJECTIVES

1) Understanding the indications of contrast enhanced ultrasound (CEUS) in focal liver and gallbladder diseases. 2) Learning about the importance of the three contrast phases and how CEUS performes in detecting and characterizing focal liver lesions and to characterize inflammatory and tumorous changes of the gallbladder wall. 3) Learning about the potential value as well as the limitations of CEUS in liver an gallbladder diseases. 4) Learning how CEUS performs when compared to B-mode and Color Doppler ultrasound, CT and MRI imaging.

ABSTRACT

Liver: In patients with favorable scanning conditions CEUS is at least as sensitive as contrast enhanced CT (CECT) in detecting malignant liver lesions. Due to its high temporal resolution, even a hyper-enhancement of a few seconds can reliably be detected, thus improving the characterization of focal liver lesions. A majority of malignant lesions can therefore be characterized as hypo-, iso- or hyper-enhancing. During the arterial phase the tumor`s vessel architecture and direction of contrast filling is important for characterizing a lesions character. Due to a high spatial resolution, novel contrast imaging techniques allow detection of washed out lesions down to 3mm in size. CEUS characterizes focal liver lesions with a much higher diagnostic confidence than conventional US and is comparable to CT and MRI. CEUS also improves intraoperative tumor detection and characterization. Using time intensity analysis a change in contrast enhancement and kinetics helps in estimating tumor response to chemotherapy. CEUS is also used to monitor local ablation therapy and is a useful imaging tool to detect early tumor recurrence. Gallbladder: CEUS can be used to better visualize ulceration, perforation, and tumors of its wall. It thus helps in optimizing clinical management, including timing for surgery. CEUS does not affect renal or thyroid function and is therefore helpful in older patients and the preferred imaging technique in young patients and those with impaired renal function.

RC610C Contrast Ultrasound of Bowel

Participants

Stephanie R. Wilson, MD, Calgary, AB (*Presenter*) Research Grant, Lantheus Medical Imaging, Inc; Equipment support, Siemens AG; Equipment support, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Attendees will recognize the association of hypervascularity with inflammatory processes in the bowel on the basis of neoangiogenesis. 2) They will appreciate the value of CEUS of the bowel, with provision of both subjective and objective blood flow determinations, useful in determining disease activity and in assessing response to therapy. . 3) They will apply the common interpretations of time itensity curves to obtain peak enhancement and area under the curve information, recognizing their direct relationship to inflammatory disease with increasing parameters.

ABSTRACT

RC611

Advances in Cardiac Nuclear Imaging: SPECT/CT and PET/CT

Thursday, Dec. 3 8:30AM - 10:00AM Location: S504CD

CA CT NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

1) Understand the technical advancements associated with new scintillation cameras and SPECT-CT and PET-CT cameras. 2) Appreciate the benefits of CT attenuation correction. 3) Appreciate the adjunctive benefits of anatomic definition provided with CT and physiologic/function information provided by SPECT and PET. 4) Improve interpretive skills related to SPECT and PET-CT.

ABSTRACT

Camera and software technology recently has rapidly advanced, providing improved SPECT image resolution and increased counting statistics. These advancements in turn have provided the possibility of reduced-time and reduced radiopharmaceutical dose image acquisitions. Moreover, increased flexibility in imaging protocols has been realized. Future development of these methods hold promise in increasing diagnostic accuracy and expanding diagnostic applications. The addition of CT to SPECT and PET has afforded the ability to perform attenuation correction, thereby minizing attenuation artifacts and increasing diagnostic specificity. With CT acquisitions of sufficient resolution, complementary anatomic diagnostic information is provided. In addition, more precise anatomic localization of SPECT and PET abnormalities significantly increases clinical applicability.

Sub-Events

RC611A Advances in Cardiac SPECT

Participants
E. Gordon Depuey, MD, New York, NY (*Presenter*) Steering Committee, Adenosine Therapeutics, LLC;

LEARNING OBJECTIVES

1) Understand software methods to cope with lower SPECT counting statistics in order to reduce scan acquisition time and/or radiopharmaceutical injected activity and their clinical impact. 2) Understand instrumentation advances that allow new cameras to perform SPECT with markedly reduced acquisition times and/or less radiopharmaceutical activity and their clinical impact. 3) Implement protocols that facilitate patient-centered imaging and that reduce patient radiation exposure.

ABSTRACT

New software methods and new innovative hardware now allow for significantly shortened SPECT acquisition times without a decrease in image quality. Advancements include iterative reconstruction, resolution recovery, and noise reduction software, and focused collimation and solid state detectors incorporated into new camera designs. Attenuation correction increases diagnostic specificity and facilitates stress-only protocols. Software advancements such such as high resolution imaging, scatter correction, and respiratory gating increase diagnostic sensitivity. There has been an intersocietal effort to promote patient-centered imaging with a focus on appropriateness guidelines, cost-containment, radiation dose reduction, and the selection of the most appropriate imaging test and protocol to suit particular patient needs. The technical advancements described above facilitate implementation of patient-centered imaging. Even with such technical advancements, however, attention to technical detail is essential to assure optimal image quality. Camera and radiopharmaceutical quality control deserve the highest priority. A systematic review of myocardial perfusion SPECT images is essential to recognize artifacts and optimize diagnostic accuracy. Case examples will be presented to reinforce this approach.

RC611B Advances in Cardiac PET

Participants
Sharmila Dorbala, MBBS, Boston, MA (*Presenter*) Research Grant, Astellas Group; Stockholder, General Electric Company; ; ; ;

LEARNING OBJECTIVES

1) Review the advantages and disadvantages of myocardial perfusion PET compared to SPECT for evaluation of coronary artery disease. 2) Learn the added value of absolute quantitative parameters derived from PET for assessment of cardiovascular disease. 3) Update of current and future clinical applications of cardiac PET imaging in cardiovascular medicine.

ABSTRACT

Novel advances in PET detectors, radiotracer availability, clinical software, as well as hybrid PET/CT and PET/MR scanners have revolutionized the clinical and investigative applications of cardiac PET. Cardiac PET myocardial perfusion imaging, in the 1970's, was a predominantly investigative tool, with home-grown software, available at select major academic centers with access to a cyclotron. Over the last decade, with easy access to PET scanners, and to positron emitting perfusion tracers, the use of cardiac PET has exploded -well beyond major academic centers to several hospitals and to large office-based practices. Commercially available software has made quantitative myocardial blood flow assessment, a main-stream clinical application. Hybrid PET/CT scanner applications- calcium score and CT based coronary angiography-have further advanced the applications of cardiac PET. PET/MR is an emerging technology with promising cardiovascular applications. Each of these exciting developments has transformed cardiac PET from a predominantly investigative tool of the 1970's to the advanced clinical tool of the 2015. The primary goal of this session is to discuss the present-day clinical and emerging applications of cardiac PET/CT and PET/MR using a practical case-based approach.

RC612

Peripheral Artery Disease (PAD)

Thursday, Dec. 3 8:30AM - 10:00AM Location: N229

VA CT MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Stephen T. Kee, MD, Stanford, CA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the basic pathology of peripheral artery disease. 2) Describe the risk factors associated with the development of peripheral artery disease. 3) Outline the benefits of providing a comprehensive clinical service in the management of PVD. 4) Discuss how to build a PVD practice. 5) Describe the basic techniques employed in the treatment of PVD.

ABSTRACT

Sub-Events

RC612A Clinical Overview of PAD

Participants
Stephen T. Kee, MD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC612B Lower Extremity CTA

Participants
Richard L. Hallett II, MD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe techniques for patient selection, acquisition, reconstruction, and interpretation of lower extremity CTA. 2) Describe evidence-based results for lower extremity CTA, and expected impact on patient care. 3) Describe a coherent plan that integrates lower extremity CTA into cost-effective clinical care.

ABSTRACT

Peripheral arterial disease (PAD) is a common cause of morbidity and mortality in developed countries. Traditionally, imaging for risk stratification and therapeutic planning involved catheter angiography. In recent years, cross-sectional imaging by CTA and MRA has proven a robust technique for non-invasive PAD assessment. Given ubiquity of CT scanning technology, CTA is widely available. High resolution datasets can be acquired rapidly, which facilitates assessment of clinically labile or trauma patients. To be optimally effective, CTA techniques require particular attention to contrast medium and scan protocol. With appropriate protocol design, data acquisition requires limited operator dependence. The acquired 3D dataset is rich with information, but requires careful scrutiny by the interpreting physician. Volumetric review of these datasets produces the most accurate results. Extensive small vessel calcification remains a potential barrier to full assessment of pedal vessels by CTA. Recent published data validates the clinical effectiveness of CTA for diagnosis of PAD and for the direction of treatment planning. Ongoing research aims to exploit the newest generation of CT scanners to acquire additional information, including dual energy data, time-resolved information, and radiation dose savings.

URL

Active Handout:Richard Lee Hallett

http://abstract.rsna.org/uploads/2015/13012018/Active RC612B.pdf

RC612C Lower Extremity MRA

Participants
Harald Kramer, MD, Munich, Germany (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the appropriate technique for peripheral MRA depending on the available hardware and the clinical question and condition of the patient. 2) Differentiate between different contrast agents and their specific characteristics. 3) Chose between different contrast agent application schemes depending on the technique used and the clinical question. 4) Compare the pros and cons of contrast-enhanced and non contrast-enhanced techniques for peripheral MRA.

ABSTRACT

The prevalence of symptomatic peripheral artery disease (PAD) ranges around 3% in patients aged 40 and 6% at an age of 60 years. Additionally, the prevalence of asymptomatic PAD lies between 3% and 10% in the general population increasing to 15% to 20% in persons older than 70 years of age. However, these data still might underestimate the total prevalence of PAD since

screening studies showed that between 10% and 50% of all patients with intermittent claudication (IC) never consult a doctor about their symptoms.These data prove the need for an accurate and reliable method for assessment of the peripheral vasculature. Digital subtraction angiography (DSA) still serves as the reference standard for all vascular imaging techniques. However, because of the absence of ionizing radiation, the use of non-nephrotoxic contrast agents or even non contrast-enhanced sequences and the large toolbox of available techniques for high-resolution static and dynamic imaging Magnetic Resonance Angiography (MRA) constitute an excellent non-invasive alternative. Different acquisition schemes and contrast agent application protocols as well as different types of data sampling for static, dynamic, contrast- and non contrast-enhanced imaging enable to tailor each exam to a specific question and patient respectively.

RC612D Endovascular Treatment of PAD

Participants
Stephen T. Kee, MD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC613

Peds Neuro

Thursday, Dec. 3 8:30AM - 10:00AM Location: E350

HN NR PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC613A Imaging of Sensorineural Hearing Loss in Children

Participants
Maura E. Ryan, MD, Chicago, IL, (mryan@luriechildrens.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review pertinent anatomy of the inner ear structures. 2) Describe pathologic CT and MRI findings of the inner ear, membranous labyrinth and cochlear nerve associated with pediatric sensorineural hearing loss.

Active Handout:Maura E. Ryan

http://abstract.rsna.org/uploads/2015/15002058/RC613A MR.pdf

RC613B Imaging Approach to Seizures in Children

Participants
Luke L. Linscott, MD, Cincinnati, OH, (luke.linscott@cchmc.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify major causes of seizures in children. 2) Understand importance of optimal MR imaging technique for epilepsy evaluation.

RC613C Perinatal Imaging of Congenital Posterior Fossa Anomalies

Participants
Ashley J. Robinson, MBChB, Doha, Qatar, (ASH@RADIOLOGIST.NET) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Revise the relevant embryology of the posterior fossa, including the brainstem, cerebellum and cisterna magna. 2) Review several criteria for evaluation of congenital posterior fossa anomalies using a case-based approach.

ABSTRACT

Active Handout:Ashley James Robinson

http://abstract.rsna.org/uploads/2015/15002062/RC613C.pdf

RC614

Interventional Series: Non-Vascular Interventions

Thursday, Dec. 3 8:30AM - 12:00PM Location: N226

IR

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Steven M. Zangan, MD, Chicago, IL (*Moderator*) Nothing to Disclose
Albert A. Nemcek JR, MD, Chicago, IL (*Moderator*) Consultant, B. Braun Melsungen AG

LEARNING OBJECTIVES

1) Describe one technique to treat ascites. 2) Explain the rationale for genomic analysis. 3) Describe two techniques to treat refractory abscesses. 4) List pros and cons of staged non-vascular interventions. 5) Describe one MR guided intervention. 6) List two indications of percutaneous cholecystostomy.

Sub-Events

RC614-01 Treating Ascites: Paracentesis, TIPs, PleuRx, Denver Shunt. Which One and Why?

Thursday, Dec. 3 8:30AM - 8:50AM Location: N226

Participants
Albert A. Nemcek JR, MD, Chicago, IL (*Presenter*) Consultant, B. Braun Melsungen AG

LEARNING OBJECTIVES

View learning objectives under main course title.

RC614-02 Confocal Laser Endomicroscopy for Microscopic Characterization of Kidney and Liver Tumors during Ongoing in Vivo Percutaneous Biopsies and ex Vivo Cryoablation: Preliminary Results

Thursday, Dec. 3 8:50AM - 9:00AM Location: N226

Participants
Afshin Gangi, MD, PhD, Strasbourg, France (*Presenter*) Nothing to Disclose
Julien Garnon, MD, Strasbourg, France (*Abstract Co-Author*) Proctor, Galil Medical Ltd
Georgia Tsoumakidou, MD, Strasbourg, France (*Abstract Co-Author*) Nothing to Disclose
Jean Caudrelier, MD, Strasbourg, France (*Abstract Co-Author*) Nothing to Disclose
Pramod P. Rao, MBBS, DMRD, Villejuif, France (*Abstract Co-Author*) Nothing to Disclose
Herve Lang, Strasbourg, France (*Abstract Co-Author*) Nothing to Disclose
Iulian Enescu, Strasbourg, France (*Abstract Co-Author*) Nothing to Disclose
Guillaume Koch, MD,MSc, Strasbourg, France (*Abstract Co-Author*) Nothing to Disclose
Veronique Lindner SR, MD, Strasbourg, France (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Needle-based Confocal Laser Endomicroscopy (nCLE) is an emerging imaging modality that enables visualization of histologic details during percutaneous coaxial needle procedures. This study is evaluating the nCLE technique during image-guided percutaneous biopsy or ablations for kidney and liver tumors.

METHOD AND MATERIALS

The confocal imaging miniprobe (diameter 0.85mm, field of view 325µm, resolution 3.5µm, imaging depth 40 to 70µm) was used in conjunction with a coaxial needle (18-gauge) in 5 patients in vivo (3 liver and 2 kidney biopsies). The coaxial needle was first positioned in the lesion under CT guidance. The miniprobe was then inserted in the coaxial needle and placed in contact with the lesion. A volume of 2,5ml of 10% fluorescein was injected intravenously before endomicroscopic imaging using a 488nm laser source. Complementary endomicroscopic and CT scan information were used to accurately adjust the needle into the targeted lesion. Biopsies were subsequently performed as per standard of care. A pathologist performed side by side histological comparison and correlation in order to define interpretation criteria. Additionally, 2 pork kidneys were imaged with nCLE ex vivo during cryoablation, following a 12-hour staining in a bath of fluorescein. The miniprobe was inserted 15 mm apart from the cryoprobe.

RESULTS

nCLE was successfully performed in all 5 patients with good quality images and movies. The pathologist was not yet able to give a precise histological diagnosis on nCLE in real-time but was able to recognize the difference in tissue architecture between fibrosis, necrosis, normal tissue and tumor areas (Fig.) with excellent correlation to traditional microscopy of the biopsy specimen. During cryoablation of ex vivo kidneys, nCLE was able to visualize clearly in real time the ice formation and tissue thawing at the location of the miniprobe. No adverse event has been observed in patients.

CONCLUSION

nCLE demonstrated distinct tissue abnormalities during percutaneous biopsy. These preliminary results suggest that nCLE is feasible and safe during interventional radiology procedures for image-guided percutaneous biopsies. This technique could be a valuable tool to help the radiologist target the lesion and monitor therapy, thus increasing biopsy yield and ablation precision.

CLINICAL RELEVANCE/APPLICATION

nCLE may serve as a new tool for increasing the precision of biopsies and ablations at the cellular level.

Handout:Afshin Gangi

http://abstract.rsna.org/uploads/2015/15009633/cofocal Microscopy.pptx

RC614-03 Ultrasound Guided Random Liver Biopsy: Impact of Biopsy Core Size on Specimen Adequacy and Procedural Complications

Thursday, Dec. 3 9:00AM - 9:10AM Location: N226

Participants
Mitchell E. Tublin, MD, Pittsburgh, PA (*Presenter*) Nothing to Disclose
Rosalind Blair, BA, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Joseph A. Martin, BA, BS, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Kristine Ruppert, Phd, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Anthony Demetris, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Despite recent imaging innovations, liver biopsy remains the gold standard for the evaluation of diffuse liver disease. A recent consensus document of the American Association for the Study of Liver Diseases (AASLD) has stressed the importance of obtaining sufficient size samples (>/= 16G) in order to minimize sampling errors of irregularly distributed liver disease. Despite this, many centers continue to utilize smaller gauge core systems to minimize perceived increased procedural complication risks. The purpose of this study was to assess the impact of core gauge (18 vs. 16G) on specimen adequacy and procedural complicaitons.

METHOD AND MATERIALS

149 patients referred for liver biopsy were sequentially randomized to 16 or 18G ultrasound (US) guided core biopsy under this HIPPA compliant IRB study. Patients were blinded to gauge size. Local anesthesia was administered for lateral segment biopsy. Post procedure hemorrhage was qualitatively evaluated (mild, moderate, severe) and pain was assessed using a 10 point rating scale at 1, 3 and 24 hours. Retrospective review of specimen adequacy included the # of cores obtained, length, and # of portal tracts. Based upon AASLD guidelines, specimen adequacy was defined as >/= 11 portal tracts. Differences in pathology metrics and pain scoring were assessed using Chi square and linear regression models..

RESULTS

No significantl hemorrhage requiring hospitalization occurred in either group and there was no difference in grouped pain scores. Mean 16G core specimen length was less than 18G length (1.7 cm vs. 1.9 cm/ $p < .05$). The mean # of portal tracts obtained with 16G biopsies was greater than 18G systems (14 vs. 13) though the difference was not significant (p=.1). 81% of 16G biopsies and 71% of 18G biopsies were adequate based upon AASLD criteria, though the difference was also not significant (p=.17).

CONCLUSION

The safety profile of US guided 18G and 16G core biopsy specimens is similar; a large % of 18 or 16G core specimens are inadequate when the AASLD specimen adequacy threshold is applied, and the adequacy rate is not significantly affected by biopsy gauge.

CLINICAL RELEVANCE/APPLICATION

Similar safety profiles, and the large % of inadequate specimens obtained with 18 and 16G core devices may prompt consideration of alternative approaches to the diagnosis of diffuse liver disease, which might include routine multiple sampling or obligatory supplemental non-invasive imaging (i.e. MRE, sonoelastography).

RC614-04 Percutaneous Biopsy for Genomic Analysis-What You Need to Know

Thursday, Dec. 3 9:10AM - 9:30AM Location: N226

Participants
Steven M. Zangan, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC614-05 Refractory Pancreatic Abscesses-The Multidisciplinary Approach

Thursday, Dec. 3 9:30AM - 9:50AM Location: N226

Participants
Rakesh C. Navuluri, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC614-06 Unknown Case of the Session

Thursday, Dec. 3 9:50AM - 10:10AM Location: N226

Participants
Steven M. Zangan, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC614-07 Debate: Staged Procedures

Thursday, Dec. 3 10:10AM - 10:30AM Location: N226

Participants
Steven M. Zangan, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Charles T. Burke, MD, Chapel Hill, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC614-08 Feasibility of Gallbladder Cryoablation: Proof of Concept in a Swine Model

Thursday, Dec. 3 10:30AM - 10:40AM Location: N226

Awards
Trainee Research Prize - Resident

Participants
Hugh C. McGregor, MD, San Francisco, CA (*Presenter*) Research Grant, HealthTronics, Inc
Maythem Saeed, DVM, PhD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Andrew Surman, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Steven W. Hetts, MD, San Francisco, CA (*Abstract Co-Author*) Consultant, Silk Road Medical Inc Consultant, Medina Medical Inc Research Grant, Stryker Corporation Data Safety Monitoring Board, Stryker Corporation
Mark W. Wilson, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Miles B. Conrad, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Perioperative mortality during high-risk cholecystectomy may be as high as 19%, indicating a need for a minimally invasive definitive treatment option. This study investigates the feasibility of gallbladder cryoablation (GBC) in a swine model.

METHOD AND MATERIALS

Animals: Under IACUC approval, five farm pigs (30-45 kg) were used in this acute study. Contrast enhanced CT: A contrast enhanced CT of the abdomen was acquired for planning purposes. Cryoablation: The Endocare® Cryocare® cryoablation system was used. Under CT guidance, up to 4 cryoprobes were positioned percutaneously about the gallbladder. Two freeze-thaw cycles ranging from 10 to 26 minutes were performed with intermittent CT scanning to ensure adequate ablation margins. Thermocouple probes were placed percutaneously at the gallbladder fundus, neck, free wall, and gallbladder fossa. Histology: Five hours following completion of the last freeze cycle, the pigs were sacrificed. The gallbladder and ducts were resected en bloc and fixed in formalin with the thermocouple sites marked with sutures. Histology was assessed following hematoxylin and eosin staining.

RESULTS

Cryoablation: GBC was successful in all 5 pigs using 3 to 4 cryoprobes and freeze cycles ranging from 10 to 26 minutes. All thermocouple probes reached at least -20 C. Intra- and post- procedural heart rate, blood pressure, and oxygen saturation remained stable. Intra-procedural body temperature consistently decreased to below 95 F and recovered after the procedure.Imaging: The gallbladders measured less than 6 cm in greatest dimension. A 5 mm ablation margin was achieved about the gallbladder, including the adjacent hepatic parenchyma in the gallbladder fossa. Non-target ablation occurred in 1 animal (stomach), with less than 5 mm of ice ball penetration.Histology: Histologic specimens demonstrated denudation of the gallbladder epithelium, hemorrhage and edema within the muscularis layer, and an inflammatory infiltrate within the adventitia. Sparing of the common bile duct was also noted.

CONCLUSION

GBC in swine is feasible, with transmural ablation and sparing of adjacent structures achieved. Gastric inclusion in the ablation zone will require hydrodissection or continuous lavage in future experiments.

CLINICAL RELEVANCE/APPLICATION

GBC is feasible, offering a potential minimally invasive treatment option for high-risk patients. Long-term studies are needed to further explore the safety and efficacy of GBC.

RC614-09 Percutaneous versus Open Surgical Drainage of Abdominal Abscesses: Trends in Use of the Two Approaches

Thursday, Dec. 3 10:40AM - 10:50AM Location: N226

Participants
David C. Levin, MD, Philadelphia, PA (*Presenter*) Consultant, HealthHelp, LLC; Board of Directors, Outpatient Imaging Affiliates, LLC
Laurence Parker, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Vijay M. Rao, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare trends in the use of percutaneous and surgical approaches to treating abdominal abscesses in recent years in a large population.

METHOD AND MATERIALS

The nationwide Medicare Physician/Supplier Procedure Summary Master Files for 2001 through 2013 were searched. This database covers over 37.3 million Medicare fee-for-service beneficiaries. It provides volume and other administrative data on every procedure code in the Current Procedural Terminology, version 4 (CPT-4) manual. CPT-4 codes were selected for the 4 types of abdominal abscesses that had distinct codes for both open surgical and percutaneous drainage - appendiceal, peritoneal, subphrenic, and liver. Medicare specialty codes were used to determine if the procedures were performed by radiologists or other nonradiologist physicians. Trends in use of the 2 approaches were compared.

RESULTS

In 2001, there were 14,068 abdominal abscesses drained percutaneously. This volume increased progressively every year thereafter, reaching 28,486 in 2013 (+102%). Open surgical drainage volume was 8146 in 2001, decreasing progressively to 6397 in 2013 (-21%). In 2001, 63% of all abdominal abscesses had been drained percutaneously; by 2013 this figure had risen to 82%. In 2001, radiologists performed 97% of all percutaneous abdominal abscess drainages, and this percent share remained unchanged in 2013. Of all abdominal abscesses treated in 2013 in Medicare patients, 79% were treated by radiologists.

CONCLUSION

Percutaneous drainage of abdominal abscesses has steadily gained in utilization, while that of open surgical drainage has declined. The vast majority of these abscesses are now treated percutaneously. Radiologists strongly predominate in performing the procedures. Although this database does not provide information on outcomes, percutaneous drainage is another good example of radiology-related value, in that an imaging-based interventional procedure developed by radiologists has largely replaced an older surgical approach that is more invasive, more costly, and carries greater morbidity for the patient.

CLINICAL RELEVANCE/APPLICATION

The vast majority of abdominal abscesses are now treated by percutaneous drainage.

RC614-10 Accuracy Testing of a Needle Placement Robot for Biopsy Under CT Guidance: Validation with Animal Study

Thursday, Dec. 3 10:50AM - 11:00AM Location: N226

Participants
Sang Young Oh, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Joon Beom Seo, MD, PhD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Namkug Kim, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Stockholder, Coreline Soft, Inc
Hongho Kim, Yongin-si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hee Jun Park, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Purpose of this study is to evaluate accuracy of a needle placement robot for biopsy with swine including artificial lesions.

METHOD AND MATERIALS

The robot system including 5-axis robot arm, a mobile platform with motor controllers, dedicated workstation for planning of needle path, and the navigation system (Polaris Spectra®; NDI, Canada) was developed. It provides useful functions including such as needle path planning, respiration monitoring, laser guidance, automatic needle positioning and guiding. To evaluate the accuracy and repeatability of the system in needle placement, two swine were used. For preparation, they were anesthetized and ventilated. Under CT guidance (Sensation 16, Siemens, Germany), multiple metallic markers were inserted to the liver, kidney and paraspinal muscle. The respiration of the swine was controlled with ventilator and intravenous injection of muscle relaxant. CT scan was performed to localize the target lesion and the CT data was transferred to the system. The spatial relation between swine and the robot system was registered with navigation system. After planning the needle path on workstation, the spatial information was translated to the robotic system. The robot system automatically angulates the needle to the target and depth of insertion is determined. Total of 22 needle insertion trials to 9 artificial target lesions at different needle paths was performed. Using the CT images after the insertion, distance between the target and actual needle tip and angle between preplanned route and actual needle pathway were measured. In 12 trials, repeated insertion of needle was performed to assess reproducibility.

RESULTS

All experiment was done without complication. The procedure time between the initial CT scan and CT scan after needle insertion was 7.8±2.7minutes. The distance and angulation were 8.5±5.1mm and 7.1±5.6degree, respectively. The distance and angle of repeated insertion with same planning was reproducible (ICC=0.931, 0.914, respectively).

CONCLUSION

Developed robot system provides fast and reliable guidance of needle placement with CT imaging in animal experiment.

CLINICAL RELEVANCE/APPLICATION

Developed robot system might be useful assisted tool in CT guided biopsy and ablation therapy, providing variable functions including such as needle path planning, respiration monitoring, laser guidance, automatic needle positioning and guiding.

RC614-11 MR Guided Intervention

Thursday, Dec. 3 11:00AM - 11:20AM Location: N226

Participants
Aytekin Oto, MD, Chicago, IL, (oto@uchicago.edu) (*Presenter*) Research Grant, Koninklijke Philips NV; ; ;

LEARNING OBJECTIVES

View learning objectives under main course title.

Honored Educators

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Aytekin Oto, MD - 2013 Honored Educator

RC614-12 Cholecystostomy. Update for 2015 (or Do Surgeons Ever Operate on Acute Cholecystitis Anymore?)

Thursday, Dec. 3 11:20AM - 11:40AM Location: N226

Participants
Charles T. Burke, MD, Chapel Hill, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC614-13 Wrap Up and Discussion

Thursday, Dec. 3 11:40AM - 12:00PM Location: N226

Participants

RC615

BI-RADS (An Interactive Session)

Thursday, Dec. 3 8:30AM - 10:00AM Location: E450A

BR DM MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC615A BI-RADS: Mammography

Participants
Edward A. Sickles, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand and use the new approach to classifying breast density. 2) Properly use current BI-RADS assessment categories. 3) Report discordances between assessment category and management recommendation.

RC615B Ultrasound

Participants
Ellen B. Mendelson, MD, Chicago, IL (*Presenter*) Medical Advisory Board, Delphinus Medical Technologies, Inc; Research support, Siemens AG; Consultant, Siemens AG; Speaker, Siemens AG; Medical Advisory Board, Quantason, LLC; Consultant, Quantason, LLC;

LEARNING OBJECTIVES

At the conclusion of this session on BI-RADS for US, learners will be able to 1. Understand inseparability of image quality and interpretability. 2. Assess breast masses using a trio of feature categories: shape, margin, orientation. 3. Apply the principle of multiple benign masses to address low PPV's of breast US. 4. Recognize architectural distortion and other Associated Features.

ABSTRACT

RC615C MRI

Participants
Elizabeth A. Morris, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the new MRI BI-RADS® descriptors including background parenchymal enhancement (BPE). 2) Properly apply the Final Assessment categories, particularly BI-RADS® 0 for MRI. 3) Apply the audit recommendations to your breast MRI practice.

RC616

Tweet This: How to Make Radiology More Patient Centered (Sponsored by the RSNA Public Information Committee)

Thursday, Dec. 3 8:30AM - 10:00AM Location: S403A

LM PR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Judy Yee, MD, San Francisco, CA, (judy.yee@ucsf.edu) (*Moderator*) Research Grant, EchoPixel, Inc
Whitney Fishman Zember, MBA, New York, NY (*Presenter*) Nothing to Disclose
Susan D. John, MD, Houston, TX (*Presenter*) Nothing to Disclose
Elliot K. Fishman, MD, Owings Mills, MD (*Presenter*) Research support, Siemens AG Advisory Board, Siemens AG Research support, General Electric Company Advisory Board, General Electric Company Co-founder, HipGraphics, Inc

LEARNING OBJECTIVES

1) Understand the rationale for and growing value of increased personalization of patient interactions in diagnostic radiology. 2) Communicate patient-centered radiology principles to residents and other colleagues. 3) Identify different avenues, including traditional, digital and social media, to engage our patients.

ABSTRACT

Modern medicine has become so complicated and sub-specialized that patients and their families often are confused. Frequently patients are not even aware that a radiologist is providing important services or the nature of those services. Increasingly, patients are turning to the Internet for answers. In the current era of consumer-driven healthcare, patient portals, online health resources and social media, radiologists must provide personal and patient-friendly services and use a variety of means to connect with patients. This course will provide specific examples and strategies for harnessing the power of the Internet and social media to become more patient centered.

Honored Educators

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Elliot K. Fishman, MD - 2012 Honored Educator
Elliot K. Fishman, MD - 2014 Honored Educator

RC617

MR Neurography and New Methods to Image Pain

Thursday, Dec. 3 8:30AM - 10:00AM Location: S505AB

NR MR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Sandip Biswal, MD, Stanford, CA (*Moderator*) Co-founder, SiteOne Therapeutics Inc; Research Grant, General Electric Company; Stockholder, Atreus Pharmaceuticals Corporation

Sub-Events

RC617A MR Neurography of the Brachial Plexus and Upper Extremities

Participants
Amelie M. Lutz, MD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the role of/indications for MR neurography in the multidisciplinary diagnostic work-up of brachial plexus and upper extremity nerve pathologies. 2) To understand the technical requirements and challenges of MR neurography in the brachial plexus and upper extremities. 3) To get familiar with the anatomy and normal MR imaging appearance of the brachial plexus and upper extremity nerves. 4) To recognize commonly encountered pathologies and their differential diagnoses in brachial plexus and upper extremity nerves.

ABSTRACT

Continuous improvements in magnetic resonance scanner, coil, and pulse sequence technology have resulted in the ability to perform routine, high-quality imaging of the brachial plexus and upper extremity nerves. MR neurography has evolved into a very helpful diagnostic tool in the work-up of peripheral nerve and plexus pathologies. It is commonly used for the detection and preoperative staging of neural mass lesions, in evaluating inflammatory and traumatic brachial plexus changes, confirming and/or complementing electrophysiologic exams. This talk will focus on the technical requirements for imaging the brachial plexus and upper extremities, discuss the anatomy, and demonstrate relevant examples of normal and abnormal findings.

RC617B MR Neurography of the Lumbar Plexus and Lower Extremities

Participants
Avneesh Chhabra, MD, Dallas, TX, (avneesh.chhabra@utsouthwestern.edu) (*Presenter*) Research Consultant, Siemens AG; Consultant, ICON plc

LEARNING OBJECTIVES

1) Employ new techniques for LS plexus and lower extremity evaluation. 2) Understand the differences between normal and abnormal imaging appearances of LS plexus and lower extremity peripheral nerves. 3) Discuss the differential diagnosis of various LS plexus and lower limb nerve pathologies based on available clinical history and imaging findings. 4) Learn how to incorporate the MRN modality in the diagnostic algorithm of plexopathies and related peripheral neuropathies in a multi-disciplinary fashion.

ABSTRACT

Lumbosacral plexus has a complex anatomy with a number of nerve convergences and divergencesresulting in formation of multiple essential peripheral nerves that provide motor and sensory function tothe pelvis and lower extremities. Due to the deep location and complexity, MR neurography (MRN) plays amajor role in evaluation of its normalcy and pathologic states.This talk will discuss current state of the art techniques available for LS plexus evaluation and show normal and abnormal imaging appearances of various common and uncommon pathologic states involving LS plexus and its branch nerves.The talk will specifically address new 3D techniques that suppress vessel signal effectively while preserving effective nerve visualization. Role of MRN in chronic pelvic pain, nerve injuries and its incremental value over conventional lumbar spine imaging will be discussed. Current role of functional DTI in qualitative and quantitative assessment of nerve pathology and tumors will be highlighted.

RC617C DTI of the Peripheral Nervous System

Participants
Gustav Andreisek, MD, Zurich, Switzerland (*Presenter*) Grant, Holcim Ltd; Grant, Siemens AG; Speaker, Mepha Pharma AG; Speaker, Guerbet SA; Travel support, Guerbet SA; Consultant, Otsuka Holdings Co, Ltd; Travel support, Otsuka Holdings Co, Ltd; Institutional Research Grant, Bayer AG; Institutional Research Grant, Guerbet AG; Institutional research collaboration, Siemens AG; Institutional research collaboration, Koninklijke Philips NV; Speaker, General Electric Company; Speaker, Koninklijke Philips NV; Speaker, Siemens AG; ;

LEARNING OBJECTIVES

1) Identify the basic microanatomy of peripheral nerves, main pathologic conditions, and physiologic principles of diffusion-weighted tensor imaging (DTI). 2) Apply diffusion-weighted tensor imaging (DTI) to imaging protocols for peripheral neuropathies, used for both, research and clinical practice. 3) Analyze diffusion-weighted tensor imaging (DTI) images both quantitatively and qualitatively. 4) Understand the current applications but also limitations of diffusion-weighted tensor imaging (DTI) of peripheral nerves.

ABSTRACT

Diffusion tensor imaging (DTI) is an MR imaging technique which uses the random motion (diffusion) of water molecules within biologic tissues. Due to the tissues ` distinct structural properties, the diffusion is hindered in some directions but at the same typically not hindered in other directions.DTI is a well known imaging technique in the brain and central nervous system, but its application to the periperal nerveous system was limited in the past due to multiple technical reasons. However, numerous recent studies show now that the technique cannot only be applied sucessfully to image peripheral nerves, but they also showed that the technique is very sensitive and specific for the detection of peripheral nerve injuries and other neuropathies. DTI may also serve as a biomarker for the demyelination of axons and the extend of nerve fiber loss.The refresher course will cover the basic principles of DTI, the challanges and limitations for imaging protocols, as well as the evaluation of DTI images (both quantitatively and qualitatively). MR tractography of peripheral nerves will also be covered.

RC617D PET and MR Methods to Image Pain

Participants
Sandip Biswal, MD, Stanford, CA (*Presenter*) Co-founder, SiteOne Therapeutics Inc; Research Grant, General Electric Company; Stockholder, Atreus Pharmaceuticals Corporation

LEARNING OBJECTIVES

1) Understand the challenges of current conventional imaging approaches in diagnosing peripheral pain generators. 2) Understand the basis for identifying specific molecular and cellular biomarkers of pain and how these biomarkers can be exploited with molecular and cellular imaging techniques. 3) Demonstrate both clinical and pre-clinical PET/MR or advanced MRI approaches in identifying pain generators.

ABSTRACT

Chronic pain is now the prevalent disease in the world. The chronic pain sufferer is currently faced with a lack of objective tools to identify the source of their pain. The goal of this session is to describe new clinical molecular imaging and emerging molecular/cellular imaging methods to more accurately localize chronic pain generators/drivers so that we may objectively identify and more intelligently act upon the cause in a pain sufferer. Successful imaging of pain is relying heavily upon a multidisciplinary effort that include expertise from of a number of scientists and clinicians in the fields of synthetic chemistry, radiochemistry, magnetic resonance physics/engineering, molecular pain neurobiology, clinical pain, radiology and others. A number of clinical and emerging pre-clinical approaches in positron emission tomography (PET) and magnetic resonance imaging (MRI) will be described. These imaging methods will demonstrate how the site of increased nociceptive activity is highlighted in the peripheral nervous system and spinal cord.

RC618

Interactive Quiz Cases in Body Oncologic Imaging (An Interactive Session)

Thursday, Dec. 3 8:30AM - 10:00AM Location: E353A

OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC618A Chest Masses

Participants
Cristina Fuss, MD, Portland, OR, (fussc@ohsu.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe characteristic imaging features of malignant chest masses. 2) Characterize benign pulmonary masses that may mimic malignancies. 3) Describe common imaging pitfalls in differentiating benign from malignant masses. 4) Determine the need for further imaging vs. invasive procedures of pulmonary masses depending on their imaging appearance.

ABSTRACT

Two common descriptors are used in describing pulmonary lesions: nodules and masses. A nodule is small and measures less than 3 cm. Masses by definition are larger than 3 cm. Given their larger size, masses are usually not as difficult to detect as are the smaller nodules. But once detected the differential diagnosis entails more than just primary pulmonary malignancy, although the majority may end up being diagnosed as cancer. Tissue sampling of large masses is usually one of the first steps, but several imaging criteria may help guide and sometimes even obviate invasive procedures. The chronicity, location of the mass and associated symptoms are important factors that should always be taken into consideration when evaluating pulmonary masses, only to name a few.

RC618B Abdominal Masses

Participants
Chandana G. Lall, MD, Orange, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn typical and atypical features of some benign and malignant abdominal masses on CT and MRI. 2) Characterize features on CT and MRI that may mimic malignancy in benign lesions and vice versa. 3) Discuss logical work-up of lesions, further imaging, need for intervention and follow-up guidelines.

ABSTRACT

1. Describe characteristic imaging features of a few benign and malignant abdominal masses on CT and MRI 2. Illustrate benign masses that may mimic malignancy and imaging pitfalls in differentiating benign and malignant lesions 4. Logical work up of lesions; further imaging and need for intervention

Honored Educators

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Chandana G. Lall, MD - 2013 Honored Educator

RC618C MSK/Soft Tissue Masses

Participants
Sandra Schmahmann, MD, Portland, OR, (schmahma@ohsu.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize common benign soft tissue masses with characteristic MRI features, that do not require follow up or biopsy. 2) Evaluate soft tissue masses by location, signal intensity characteristics, size and relationship to certain anatomic structures in order to develop a differential diagnosis. 3) Suggest appropriate management of the soft tissue mass based on MRI features.

ABSTRACT

Several common benign soft tissue masses, such as lipoma, hemangioma, gangion, peripheral nerve sheath tumor, myositis ossificans and hematoma, have characteristic MRI features that allow the radiologist to make the diagnosis, and do not require follow up or biopsy.Lesions that arise from specific structures (e.g. giant cell tumor of the tendon sheath and peripheral nerve sheath tumor) or in certain anatomic locations (e.g. elastofibroma deep to the scapula) can further aid characterization. Size and

signal intensity characteristics are additional criteria that help develop an appropriate differential diagnosis.Based on MRI features, the radiologist can suggest appropriate management and advise whether a biopsy is necessary.

RC621

Medical Physics 2.0: Magnetic Resonance Imaging

Thursday, Dec. 3 8:30AM - 10:00AM Location: E451A

MR PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ehsan Samei, PhD, Durham, NC (*Director*) Nothing to Disclose
Douglas E. Pfeiffer, MS, Boulder, CO (*Director*) Nothing to Disclose

Sub-Events

RC621A Magnetic Resonance Imaging Perspective

Participants
Douglas E. Pfeiffer, MS, Boulder, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the history and development of magnetic resonance imaging equipment. 2) Understand the impact of equipment development on testing protocols. 3) Understand the requirements for medical physics support in image quality and safety.

ABSTRACT

Magnetic resonance imaging equipment has developed significantly since its inception. Field strength increases and technology development increase the complexity of the equipment and the need for medical physics and MRI scientist support. This talk will briefly introduce the developments that have taken place and discuss the impact that this development has had on testing and support.

RC621B Magnetic Resonance Imaging 1.0

Participants
Ronald Price, PhD, Nashville, TN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the image quality metrics that are currently used as part of an MRI system performance report. 2) Discuss how the medical physicist can assist in the development and evaluation of imaging sequences used as part of clinical protocols. 3) To review items that should be included as part of an MRI safety survey. 4) Discuss the steps necessary for establishing and maintaining a routine quality assurance program. 5) Review aspects of AAPM Report No. 100 regarding acceptance testing of new MRI systems. 6) Review modality and system specific requirements for MRI accreditation.

ABSTRACT

MRI 1.0: Magnetic Resonance Imaging Ronald R. Price The purpose of this presentation is to review the current role of the medical physicist in clinical Magnetic Resonance Imaging (MRI). The discussion will first discuss MRI acceptance testing with reference to the recommendations of AAPM Report No. 100 and will specifically include items that should be part of both the initial and annual MRI safety survey. This discussion will be followed by a review or the image quality metrics that are currently used as part of an MRI system performance report as well as how the medical physicist may go about assisting in the development and evaluation of imaging sequences used as part of clinical protocols. The presentation will also discuss the steps necessary for establishing and maintaining a routine quality assurance program with emphasis on the necessity of establishing a strong working relationship with the MRI quality assurance technologist. There will also be a review of the system specific requirements for MRI accreditation.

RC621C Magnetic Resonance Imaging 2.0

Participants
David R. Pickens III, PhD, Nashville, TN (*Presenter*) Stockholder, Johnson & Johnson

LEARNING OBJECTIVES

1) Indentify requirements for improving quality assurance and compliance tools for advanced and hybrid MRI systems. 2) Indentify the need for new quality assurance metrics and testing procedures for advanced systems. 3) Identify new hardware systems and new procedures needed to evaluate these systems. 4) Understand safety concerns for personnel and patients from advanced systems. 5) Recognize the importance of the medical physicist in the clinical testing, safety evaluations, and use of these systems.

ABSTRACT

This talk will look into the future of clinical MR imaging and what the clinical medical physicist will need to be doing as the technology of MR imaging evolves. Many of the measurement techniques used today will need to be expanded to address the advent of higher field imaging systems and dedicated imagers for specialty applications. Included will be the need to address quality assurance and testing metrics for multi-channel MR imagers and hybrid devices such as MR/PET systems. New pulse sequences and acquisition methods, increasing use of MR spectroscopy, quantitative imaging, and real-time guidance procedures will place the burden on the medical physicist to define and use new tools to properly evaluate these systems, but the clinical applications must be understood so that these tools are used correctly. Finally, new rules, evolving clinical requirements, new safety concerns, and changing regulations will mean that the medical physicist must actively work to keep her/his sites compliant and must work closely with physicians to ensure best performance of these systems while ensuring the best patient care.

RC622

Personalized Medicine: Thorax

Thursday, Dec. 3 8:30AM - 10:00AM Location: S504AB

CH RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Kristy K. Brock, PhD, Ann Arbor, MI (*Moderator*) License agreement, RaySearch Laboratories AB;

Sub-Events

RC622A Personalized Medicine: Thorax - Motion and IGRT

Participants
Geoffrey Hugo, PhD, Richmond, VA, (gdhugo@vcu.edu) (*Presenter*) Research Grant, Koninklijke Philips NV; Research Grant, Varian Medical Systems, Inc

LEARNING OBJECTIVES

1) Understand how respiration impacts radiotherapy imaging and delivery and how to implement strategies to mitigate these issues. 2) Understand types and magnitude of geometric changes in thoracic anatomy during radiotherapy, and determine approaches to correct for discrepancies between the planned and delivered dose to the patient.

ABSTRACT

Radiotherapy is in widespread use for both early and advanced stage lung cancer, as a sole modality and also in combination with other modalities such as chemotherapy. Due to the potential for both acute and late toxicities in organs adjacent to treated regions, modern techniques seek to limit the extent of the high dose volume. The purpose of this session is to develop an understanding for how geometric and anatomic changes during radiotherapy can be managed. The focus will be on solutions readily available in the clinic today, particularly with respect to imaging modalities and planning solutions.

RC622B Functional Targeting and Adaptation

Participants
Martha M. Matuszak, PhD, Ann Arbor, MI (*Presenter*) Research Grant, Varian Medical Systems, Inc

LEARNING OBJECTIVES

1) Understand the opportunities for targeting and avoidance based on functional imaging in lung. 2) Discuss the technical details of functional targeting for tumor and functional avoidance in normal tissue for lung cancer in the pre-treatment and adaptive settings.

ABSTRACT

Radiation therapy continues to play an important role in the treatment of lung cancer although many opportunities remain to improve local control and survival as well as reduce toxicity, especially in advanced stage lung cancer. The use of functional imaging and biomarkers to predict tumor burden and response as well as measure and predict normal tissue toxicity has begun to increase in the community. This session aims to summarize the different modalities and types of information available to perform functional targeting or avoidance of tumor and normal tissue in lung cancer, including imaging (such as PET and SPECT) and other data (such as blood-based biomarkers). The session will also highlight the technical details associated with the use of functional data for treatment planning, treatment response, and adaptation.

RC623

MR Safety I

Thursday, Dec. 3 8:30AM - 10:00AM Location: S105AB

NR MR PH SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Joel P. Felmlee, PhD, Rochester, MN (*Director*) Nothing to Disclose

Sub-Events

RC623A MRI Safety - Rules, Regulations, and Concepts

Participants
Karl Vigen, PhD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand safety issues in MRI, particularly those caused by the main magnetic field, magnetic field gradients, and transmit RF. 2) Understand guidance from the ACR, and governmental regulations designed to address these issues. 3) Describe the importance of an MR Safety program including comprehensive patient screening in the clinical setting. 4) Briefly address safety issues regarding MRI contrast agents.

RC623B MRI Safety of Deep Brain and Other Simulators

Participants
Yunhong Shu, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe various types of neurostimulators and their clinical applications. 2) Understand the underlying MR physics associated with the risks of scanning patients with neurostimulators. 3) Learn the precaution steps to ensure the safety of the patient with neurostimulators during MR scanning.

ABSTRACT

The demands and applications for neurostimulators continue to increase as the technology advances. MRI is an important diagnostic tool for postoperative evaluation and potential future workup. The presence of the neurostimulator poses potential safety risks in the MR scanning environment. By observing certain precautions, MRI can be performed with an extremely low risks. It is important to follow the manufactures' MRI guidelines to ensure the safety of the patients and continuous functioning of the device.

RC624

The Role of Advanced Imaging in Unraveling the Secrets of Ancient Art and Artifacts

Thursday, Dec. 3 8:30AM - 10:00AM Location: S404AB

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Barry D. Daly, MD, Baltimore, MD, (bdaly@umm.edu) (*Moderator*) Research Grant, Koninklijke Philips NV
Barry D. Daly, MD, Baltimore, MD, (bdaly@umm.edu) (*Presenter*) Research Grant, Koninklijke Philips NV
Vahid Yaghmai, MD, Chicago, IL, (v-yaghmai@northwestern.edu) (*Presenter*) Nothing to Disclose
Jonathan P. Brown, MS, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe the novel use of advanced imaging techniques in the non-invasive investigation of historic art treasures. 2) To identify related benefits for both research and educational activities at museums and art institutions.

ABSTRACT

In recent years museums worldwide have sought to partner with radiology departments in the non-invasive investigation of ancient and fragile treasures. Advanced digital imaging and 3D CT have been used to determine the age, authenticity, composition and geographic origin of these artifacts, to investigate their internal contents, and to detect prior structural damage and hidden repairs. The subject material of this course includes a diverse range of significant artifacts such as Egyptian and Peruvian mummies, Mesoamerican and Chinese ceramics, Mesopotamian stucco art, Judaic tabernacles, European medieval religious artifacts, Renaissance paintings, Stradivarius violins and Japanese wood sculptures. Some conservators now have access to 3D imaging software at museums or may conduct remote collaborative analysis of cases with radiologists via cloud-based 3D servers. The speakers include two radiologists with extensive experience in the technical approach to imaging these treasures and a senior conservator at the Field museum who will provide an expert's perspective on the research and educational value of the findings.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Vahid Yaghmai, MD - 2012 Honored Educator
Vahid Yaghmai, MD - 2015 Honored Educator

RC625

Radiomics Mini-Course: Oncologic Applications

Thursday, Dec. 3 8:30AM - 10:00AM Location: S103AB

BR CH NR BQ CT NM OI RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Sandy Napel, PhD, Stanford, CA (*Director*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc

Sub-Events

RC625A Breast Cancer with PET-CT

Participants
Richard L. Wahl, MD, Saint Louis, MO (*Presenter*) Research Consultant, Nihon Medi-Physics Co, Ltd;

LEARNING OBJECTIVES

1) Describe the FDG pet uptake characteristics before therapy of 'triple - negative' breast cancers vs other subtypes.

ABSTRACT

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Richard L. Wahl, MD - 2013 Honored Educator

RC625B Radiogenomics of Lung Cancer

Participants
Michael D. Kuo, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss the principles behind lung cancer radiogenomics. 2) Highlight clinical applications of lung cancer radiogenomics.

ABSTRACT

RC625C Brain Cancer: Radiomics, Radiogenomics, and Big Data

Participants
Rivka R. Colen, MD, Houston, TX, (rcolen@mdanderson.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define the field of radiomics and imaging genomics. 2) Apply radiomics and imaging genomics in brain tumors. 3) Describe the use of MRI as a biomarker for genomic signatures and profiles. 4) Define role of MRI in personalized medicine for target discovery of therapeutic targets. 5) Explain the use of MRI in drug development and clinical trials. 6) Assess the research available in imaging genomics and radiomics. 7) Define and describe the integration of radiomics and imaging genomics into big data platforms.

ABSTRACT

This objective of this course is to introduce the recently emerged field of radiomics and imaging genomics (radiogenomics) in brain tumors, specifically glioblastoma (GBM). Emphasis will be on radiomics with regards to the high-dimensional, high-throughput feature extraction of imaging features from medical images, specifically MRI; the second emphasis will be on the use of imaging in relation to underlying tumor genomics, how to use MRI as a biomarker, surrogate and correlate of tumor genomics as well as the use of MRI as a genomic target discovery tool and its application in therapeutic discovery and drug development. The role of radiomics and imaging genomics in the era of big data and how we can leverage the imaging-omic data will also be discussed.

RC627

Challenges in Imaging Economics: Perspectives from Three Nations: Canada, UK and USA

Thursday, Dec. 3 8:30AM - 10:00AM Location: S404CD

HP

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Frank J. Lexa, MD, Philadelphia, PA (*Coordinator*) Nothing to Disclose
Frank J. Lexa, MD, Philadelphia, PA (*Moderator*) Nothing to Disclose
Geraldine B. McGinty, MD,MBA, New York, NY (*Presenter*) Nothing to Disclose
Bruce B. Forster, MD, Vancouver, BC (*Presenter*) Travel support, Siemens AG; Travel support, Toshiba Corporation;
Erika R. Denton, MBBS, Norwich, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Examine the drivers of change in radiology in three nations. 2) Compare and contrast the challenges that radiology faces globally. 3) Understand how organized radiology is adapting to a rapidly changing societal landscape for its services. 4) Analyze best practices for handling the challenges that we all face.

ABSTRACT

Radiologists in many parts of the globe are experiencing rapid changes in the way that they practice their specialty. The drivers of change and the challenges that they create are legion. In this session, we will have distinguished speakers from three nations discuss the challenges that organized radiology faces in their home countries and how they have tried to adapt in these circumstances. The topics will includes a wide ranging array of strategic considerations including but not limited to: aging patient populations, rising demand for healthcare, changing government regulation, methods of payment in the public (and where appropropriate the private) sector, regulatory issues, radiologist workforce issues and the training of the next generation of radiologists. The session will encompass both presentations and a panel discussion which will be informative and provocative

RC629

Prostate MRI Using PI-RADS (Prostate Imaging Reporting and Data System) (An Interactive Session)

Thursday, Dec. 3 8:30AM - 10:00AM Location: E450B

GU MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

1) Describe the clinical indications for prostate MRI and MRI-targeted interventions. 2) Assess technical considerations for performance of multi-parametric prostate MRI, including pulse sequences, coils, contrast administration, magnetic field strength. 3) Integrate information from T2, DCE, and DWI to analyze and report prostate MRI exams using new ACR-PIRADS methodology. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC629A Introduction to PI-RADS

Participants
Jeffrey C. Weinreb, MD, New Haven, CT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC629B Technical Considerations

Participants
Clare M. Tempany-Afdhal, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC629C How to Use PI-RADS

Participants
Jelle O. Barentsz, MD, PhD, Nijmegen, Netherlands (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Active Handout:Jelle O. Barentsz

http://abstract.rsna.org/uploads/2015/14000510/Active RC629C.pdf

RC629D Interactive Clinical Case Review

Participants

LEARNING OBJECTIVES

View learning objectives under main course title.

RC631

US for Thyroid Cancer: Diagnosis, Surveillance, and Treatment

Thursday, Dec. 3 8:30AM - 10:00AM Location: E351

NR US HN OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Jill E. Langer, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Kathryn A. Robinson, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Sheila Sheth, MD, Cockeysville, MD, (ssheth@jhmi.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the sonographic characteristics of thyroid nodules that are suspicious for malignancy. 2) a. Discuss the Bethesda Cytology Classification of Thyroid FNA results and the risk of malignancy associated with each category. b. Describe the indications for two new genetic tests that may be performed on FNAs obtained from thyroid nodules with indeterminate cytology. 3) a. Describe the technique of US-guided biopsy of thyroid nodules and cervical lymph nodes in patients who have undergone thyroidectomy for thyroid cancer. b. Discuss the rationale and method of performance of US-guided ethanol ablation of malignant cervical adenopathy in post thyroidedctomy patients.

ABSTRACT

This presentation will consist of a three individual presentations. The first will review the sonographic characteristics of thyroid nodules that are suggestive of malignancy. Recommendations for selecting which thyroid nodules require ultrasound-guided biopsies which have been provided by both Radiology consensus conferences and published Endocrinology guidelines will be discussed. The second presentation will review with the Bethesda Cytology Classification of Thyroid FNA results and the risk of malignancy associated with each category. Additionally this presentation describes the indications for two new genetic tests that may be performed on FNAs obtained from thyroid nodules with indeterminate cytology. The last presentation will provide a detailed description of the technique for performing ultrasound guided biopsy of thyroid nodules and cervical lymph nodes. Various methods will be discussed and required equipment outlined. Possible complications, though rare, will be described. A comparison of the typical sonographic features of normal versus abnormal lymph nodes will be presented in an effort to identify those patients in whom sonographic follow up can be used instead of biopsy. A discussion of the possible advantages of adding thyroglobulin assay to cytologic evaluation will be provided. The rationale for and technique of performing ultrasound guided ethanol ablation of malignant cervical lymph nodes in patients with thyroid cancer will be undertaken.

RC632

Value-Added Initiatives for a Healthcare System

Thursday, Dec. 3 8:30AM - 10:00AM Location: S104A

HP LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC632A Value Creation in Radiology: Beyond the Total Value Equation

Participants
Richard E. Heller III, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the difference between interpretive value and non-interpretive value and the concept of the Total Value Equation. 2) Understand how to illustrate where on the Operations Frontier Curve your practice or department wishes to place itself, and where you think you actually are. 3) Based on the above two objectives, be able to identify potential areas of improvement in your staffing model. (This course is part of the Leadership Track)

ABSTRACT

The term 'value' is popular in health care, and while universally understood to be critical to success, it is also a concept that is complex and can be challenging to evaluate. This talk analyzes the idea of value and value creation in the radiology department, and uses the Total Value Equation as a framework to deconstruct the activities of the department into interpretive and non-interpretive. By understanding these ideas, the radiology practice leader is better able to manage their resources and maximize their value production.

RC632B Imaging Informatics

Participants
Keith J. Dreyer, MD,PhD, Boston, MA (*Presenter*) Co-Chairman, Medical Advisory Board, Merge/IBM

LEARNING OBJECTIVES

1) Develop an understanding of the essential Informatics skills required for a leader to be successful. 2) Develop an understanding of the common Informatics errors made by leaders in academic and private practices. 3) Acquire the skills of Informatics planning needed to ensure that the success of your organization is sustainable over time. (This course is part of the Leadership Track)

RC650

Vertebral Augmentation (Hands-on)

Thursday, Dec. 3 8:30AM - 10:00AM Location: E260

MK IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
A. Orlando Ortiz, MD, MBA, Mineola, NY (*Presenter*) Nothing to Disclose
Bassem A. Georgy, MD, MSc, San Diego, CA (*Presenter*) Consultant, Johnson & Johnson; Consultant, DFINE, Inc; Stockholder, DFINE, Inc ; Stockholder, Spine Solutions, Inc; ;
Allan L. Brook, MD, Bronx, NY (*Presenter*) Advisor, Johnson & Johnson Advisor, Medtronic, Inc
Afshin Gangi, MD, PhD, Strasbourg, France (*Presenter*) Nothing to Disclose
Todd S. Miller, MD, Bronx, NY, (Tmiller@montefiore.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss appropriate algorithms for patient selection. 2) Review anatomic and technical considerations for vertebral augmentation. 3) Present an update of the recent advances in vertebral augmentation including sacroplasty. 4) Emphasize safety issues and how to avoid complications. 5) Understand the applications of vertebral augmentation in osteoporotic and neoplastic spine pathology. 6) Update participants with respect to advances in equipment and biomaterials.

ABSTRACT

1. Patient selection for vertebral augmentationIndications and Contraindications2. New devices and techniques in vertebral augmentation3. Vertebral augmentation for osteoporotic and pathologic vertebral compression fractures4. Sacroplasty (sacral augmentation)5. Complications avoidance6. EfficacyVertebral augmentation is an image-guided (fluoroscopy or CT) percutaneous procedure in which a bone needle is inserted into a painful osteoporotic or pathologic fracture within the spinal axis. Biopsy, cavity creation or lesion ablation may then be performed under imaging guidance depending on the nature of the pathology that is being treated. Subsequently a radioopaque implant, usually an acrylic bone cement, is carefully injected into the vertebra or sacral ala under imagining guidance, These procedures have been shown to provide pain relief by stabilizing the fractured vertebra or sacrum. As with any other invasive procedure, they carry a small risk (<<1%) of complication including bleeding, infection, neurovacular injury, or cement embolus. Appropriate patient seleciton and a detailed understanding of the technical aspects of the procedure along with active clinical patient follow-up are paramount to a successful outcome. This workshop will utilize short lectures, case examples and interactive audience participation in order to further explore critical topics in vertebral augmentation.

URL

Handout:Afshin Gangi

http://abstract.rsna.org/uploads/2015/4426453/Vertebral augm tumor.pptx

Active Handout:Todd Stuart Miller

http://abstract.rsna.org/uploads/2015/4426453/RC650 Vertebroplasty MILLER.pptx.pdf

RC651

Pediatric Series: Optimizing Acquisition and Achieving Efficiency in Pediatric Imaging

Thursday, Dec. 3 8:30AM - 12:00PM Location: S102D

MR PD SQ

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.50

FDA Discussions may include off-label uses.

Participants
Donald P. Frush, MD, Durham, NC (*Moderator*) Nothing to Disclose
Aliya Qayyum, MBBS, Houston, TX (*Moderator*) Nothing to Disclose
Rajesh Krishnamurthy, MD, Houston, TX (*Moderator*) Research support, Koninklijke Philips NV; Research support, Toshiba Corporation
A. James Barkovich, MD, San Francisco, CA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

ABSTRACT

This session will focus on the importance of minimizing general endotracheal anesthesia in children and discuss recent papers that highlights risks in children. It will discuss techniques for minimizing the use of sedation and intubation in pediatric imaging, including use of abbreviated protocols for common indications, feed and wrap techniques, and state of the art MR sequences for free-breathing 2-D and 3-D acquisition of morphology , function and flow in children.

Sub-Events

RC651-01 Minimizing Sedation in Pediatric Neuroimaging

Thursday, Dec. 3 8:30AM - 8:50AM Location: S102D

Participants
A. James Barkovich, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

There are several keys to minimizing sedation in Pediatric Neuroimaging. Most important are targeting the study to obtaining the specific answer requested by the referring clinician, and obtaining the data as efficiently as possible by using sequences that will answer the question in the shortest time. The second is that the strategy changes depending upon the age of the patient: neonates most often can be scanned without sedation; a relatively short scan can be performed on infants by the 'feed and swaddle' method, and older children (6 years and above) can very frequently be studied without sedation if training and/or movies (to give them focus) are used. For neonates requiring a relatively short scan (is injury present or not), a useful technique is to feed the baby immediately before the procedure and then wrap them in a vacuum bean bag or wrap (swaddle) them in a blanket. Reducing noise by use of ear muffs, insulating the inner bore of the magnet, parallel imaging or ultra-short TE sequences can help, as can retrospective motion correction. Infants can also be scanned using feed and swaddle; it helps to do the scan during their nap time, if possible, and to take them to a quiet room with a parent so that they are asleep when placed in the MRI scanner. Use quiet sequences early in the study, saving the noiser ones for the end. Again, use of parallel imaging or ultra-short TE sequences helps to reduce noise. It is very difficult to image children between ages of 1 and 6 years without sedation. The goal is to scan efficiently. for older children, a training session before the scan to reduce anxiety is useful. Use of a system that allows the child to watch a movie of their own choice is very helpful as well.

RC651-02 Comparison of Non-sedated Brain MRI and CT for the Detection of Acute Traumatic Injury in Children Less than 5 Years Old

Thursday, Dec. 3 8:50AM - 9:00AM Location: S102D

Participants
Joseph Y. Young, MD, Boston, MA (*Presenter*) Nothing to Disclose
Ann-Christine Duhaime, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Paul A. Caruso, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Ari Cohen, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Jean Klig, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Sandra Rincon, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The 2014 ACR Appropriateness Criteria consider CT the first line study for acute intracranial injury in children because of its wide availability, detection of acute hemorrhage, and lack of sedation. A tailored MRI study with rapidly acquired sequences can obviate the need for sedation and radiation. We compared the sensitivity of rapid non-sedated brain MRI and CT for the detection of traumatic head injury in young children.

METHOD AND MATERIALS

We reviewed a consecutive series of children less than 5 years old who presented to our ED during a 5 year period with head trauma and received a non-sedated brain MRI and CT within 24 hours of injury. Most MRI studies were limited to triplane T2 and susceptibility sequences. A few studies had additional sequences, including FLAIR and DWI, if clinically indicated and if the patient could tolerate a longer exam. Two neuroradiologists concurrently reviewed the MRI and CT studies on separate days and assessed

for the following five findings: fracture, epidural hematoma (EDH)/subdural hematoma (SDH), subarachnoid hemorrhage (SAH), intraventricular hemorrhage (IVH), and parenchymal injury.

RESULTS

27 patients met inclusion criteria with a mean age of 21 months. A total of 49 abnormalities was noted in 25 patients, with 21 patients having intracranial findings. There was 79% agreement between the two modalities assessing for the presence of fracture, EDH/SDH, SAH, IVH, and parenchymal injury for each patient. CT missed 13 findings which included 6 EDH/SDH, 5 SAH, and 2 parenchymal injuries. MRI missed 13 findings which included 10 non-displaced fractures (of 17 fractures), 2 small EDH/SDH, and 1 SAH. The CT was negative for 4 patients in whom the MRI demonstrated intracranial findings (4 EDH/SDH, 2 SAH, 2 parenchymal). MRI was negative in 1 patient for whom CT had intracranial findings (1 small EDH/SDH).

CONCLUSION

Non-sedated MRI is at least as sensitive as CT for the detection of intracranial injury in young children presenting with acute head trauma, though missed 10 of 17 fractures. Non-sedated MRI may be a useful alternative to CT in select populations. Low-dose CT may be obtained when fracture detection is clinically indicated.

CLINICAL RELEVANCE/APPLICATION

Non-sedated MRI may be a useful alternative to CT for young children presenting with acute head trauma, thereby avoiding associated radiation risks.

RC651-03 Quantifying the Radiation Dose Savings of Implementing an Ultra-Fast Brain MRI Protocol for Children with Hydrocephalus

Thursday, Dec. 3 9:00AM - 9:10AM Location: S102D

Participants
Daniel Durand, MD, Baltimore, MD (*Presenter*) Stockholder, Evolent Health, LLC; Advisor, National Decision Support Company; Advisor, Radiology Response; Founder, am-I-ok.com
Mahadevappa Mahesh, MS, PhD, Baltimore, MD (*Abstract Co-Author*) Author with royalties, Wolters Kluwer nv
Thierry Huisman, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Eric M. Jackson, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Allison Greene, BS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Siyuan Cao, BS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Aylin Tekes, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Children with shunted hydrocephalus frequently require neuroimaging to evaluate shunt function. For a number of practical reasons including length of study, need for sedation, and scanner availability, CT is favored over MRI at most centers. Children are also more susceptible than adults to radiation-induced cancer, with empirical evidence showing that the pediatric brain is particularly prone to cancers associated with CT. Previous reports have shown that ultrafast MRI can be used in place of head CT for evaluating hydrocephalus without any loss of sensitivity or specificity. The purpose of our study was to quantify the net radiation dose savings associated with transitioning from head CT to ultrafast brain MRI in this population.

METHOD AND MATERIALS

An ultra-fast brain MRI protocol without sedation/anesthesia with an average scan time under 5 min was implemented for children with shunted hydrocephalus. A RIS query was designed to extract all neuroimaging orders for obstructive hydrocephalus for two time periods: a 3 month baseline period and a 6 month post-intervention period. The number of CTs performed per month was determined for each period and used to determine the number of cases avoided per month. Size-specific dose estimates for 30 patients in the baseline group were determined using measurements of anteroposterior and mediolateral head diameter as well as CTDIvol and scan length data stored on the PACS. The average dose per case and the CT avoidance rate were used to yield estimates of the annual radiation dose savings to the population in units of size-specific dose estimate (mGy) and age-adjusted effective dose (mSv).

RESULTS

The pre- and post-intervention imaging rates were 20.7 and 8.5, yielding a CT avoidance rate of 12.2 per month. The mean size-specific dose estimate (Figure 1) per CT was 30.40 mGy and the mean age-adjusted effective dose was 1.76 mSv. The annual population radiation dose savings was 4,450 mGy and 258 mSv.

CONCLUSION

Implementing a standard protocol to encourage the use of ultrafast brain MRI in place of head CT significantly reduced the annual radiation dose to pediatric patients imaged for hydrocephalus.

CLINICAL RELEVANCE/APPLICATION

Our results show the benefit of using ultrafast brain MRI in place of head CT for suspected hydrocphalus. The method used here to quantify population radiation dose savings can be used more generally to highlight the value that radiologists and medical physicists bring to care pathway redesign.

RC651-04 Silent MRI Reduces Children's Risk by Decreasing Need for Additional Sedation

Thursday, Dec. 3 9:10AM - 9:20AM Location: S102D

Participants
Chisato Matsuo, MD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshiyuki Watanabe, MD, PhD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Hisashi Tanaka, MD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroto Takahashi, MD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Atsuko Arisawa, MD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Noriyuki Tomiyama, MD, PhD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose

Eri Yoshioka, MD, Matsubara, Japan (*Presenter*) Nothing to Disclose
Shin Nabatame, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Sayaka Nakano, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Matthew W. Lukies, MBBS, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Sedated children often wake up during magnetic resonance imaging (MRI) and additional sedatives are needed; the acoustic noise during the MR scanning might be the main cause of this. We hypothesized that silent MRI would decrease the frequency of arousal and additional administration of sedatives during examinations when compared with conventional MRI.

METHOD AND MATERIALS

Twenty-eight children (M:F=18:10, age 13 months-8 years, mean 4.3 years, median 5 years) who underwent silent brain MRI from January to August in 2014 were retrospectively compared to 26 children (M:F=10:16, age 4 months-8 years, mean 4.0 years, median 3 years) who underwent conventional brain MRI from May to December in 2013 with the same 3T MR unit. The pediatrician administered intravenous sedatives including thiopental to all patients. Data from the medical chart of each patient was reviewed as follows: administered sedatives, doses, and need for additional intravenous injections during examinations. Unpaired t-test was used in the statistical analysis of the initial dose of thiopental. The need for additional sedation was assessed by Fisher's exact test.

RESULTS

The mean initial dose of thiopental was 3.1 mg/kg for conventional MRI group and 3.3 mg/kg for silent MRI group. There was no significant difference between the two groups (p=0.55). Ten out of twenty-six patients (38%) woke up during conventional MRI and additional sedatives were needed. On the other hand, three out of twenty-eight patients (11%) woke up during silent MRI and required additional sedatives. There was a significant difference between the two groups (p=0.02).

CONCLUSION

Silent MRI decreased the frequency of arousal and additional intravenous sedation during examinations. This can reduce patient risk and may possibly reduce the amount of time required for examinations.

CLINICAL RELEVANCE/APPLICATION

Silent MRI can reduce children's risk by decreasing the need for additional sedation and may possibly reduce the amount of time required for examinations; silent MRI is recommended in routine brain evaluation for children.

RC651-05 High-pitch CT of the Chest in Newborns and Infants: Is Sedation or Breath-hold Still Necessary?

Thursday, Dec. 3 9:20AM - 9:30AM Location: S102D

Participants
Ilias Tsiflikas, MD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Matthias Teufel, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Michael Esser, MD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Sergios Gatidis, MD, Tubingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Ines Ketelsen, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Sabrina Fleischer, MD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Konstantin Nikolaou, MD, Tuebingen, Germany (*Abstract Co-Author*) Speakers Bureau, Siemens AG Speakers Bureau, Bracco Group Speakers Bureau, Bayer AG
Juergen F. Schaefer, MD, Tuebingen, Germany (*Presenter*) Nothing to Disclose

PURPOSE

To evaluate feasibility and image quality of high-pitch computed tomography of the chest without sedation or breath-hold in newborns and infants under the age of 12 months.

METHOD AND MATERIALS

IRB waived informed consent and approved this retrospective, HIPAA-compliant study. 88 patients (48 boys, age 153 ± 103 days) received 123 high-pitch CT examinations (HPCT) of the chest between October 2010 and December 2014. All examinations were scanned in free breathing. 84 HPCT were without sedation or general anesthesia, whereas 39 examinations were performed in general anesthesia because of patients' clinical condition. 84/123 HPCT were contrast-enhanced. Tube voltage and current were determined according to our institutional weight-adopted standard scanning protocol (70-100 kV; 6 - 80 mAs). Image quality was evaluated by two experienced pediatric radiologists with respect to typical artifacts arising from movement, breathing or pulsation of the heart or pulmonary vessels (0 - no; 1 -moderate; 2 - severe artifacts). Effective dose (E eff) was estimated according to the European Guidelines on Quality Criteria for Multislice Computed Tomography.

RESULTS

All examinations were performed without the notice of moving artifacts. In awake patients there was a higher frequency of moderate breathing artifacts (19/84 vs. 1/39, p<0.01) and pulsation artifacts (19/84 vs. 8/39, p=0.79), but in no examination severe artifacts could be detected.The overall dose was very low (0.52 ± 0.30 mSv). As expected the estimated E eff was higher in contrast-enhanced examinations than in non-enhanced scans (0.58 ± 0.33 vs. 0.40 ± 0.18 mSv). Further E eff was higher in examinations in general anesthesia (0.61 ± 0.42 vs. 0.48 ± 0.22 mSv), what might be explained due to a higher rate of contrast-enhanced scans (79% vs. 63%) in this patient group.

CONCLUSION

High-pitch scanning allows the examination of the chest in newborns and infants without sedation or breath-hold in sufficient image quality and with low effective doses.

CLINICAL RELEVANCE/APPLICATION

Newborns and infants undergoing chest CT can be examined without sedation or breath-hold without significant loss in image quality.

RC651-06 The Optimal Scanning Protocol of Prospective ECG-triggering DSCT Thoracic Angiography in Children with Tetralogy of Fallot

Thursday, Dec. 3 9:30AM - 9:40AM Location: S102D

Participants
Yanhua Duan, MD, Jinan, China (*Presenter*) Nothing to Disclose
Ximing Wang, Jinan, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the effect of 4 different scanning protocols (bolus-tracking technique, test-bolus technique, fixed delay time technique and "manual" bolus-tracking technique) on image quality and effective dose of prospective ECG-triggering DSCT thoracic angiography in children with TOF.

METHOD AND MATERIALS

Eighty consecutive children (48 boys; mean age of 3.5 years; mean heart rate: 97 bpm) with known or suspected TOF were enrolled between December 2008 and September 2014 in our institute. All children underwent prospective ECG-triggering DSCT thoracic angiography.All patients were assigned to 4 groups randomly according to the different enhanced scanning protocols: bolus-tracking technique (n=20, group A), test-bolus technique (n=20, group B), fixed delay time (25s) technique (n=20, group C) and "manual" bolus-tracking technique (place the region of interest in the background at the level of four-chamber, a monitoring scanning started at 18s after injection, the acquisition was manually triggered at the moment that the contrast medium artifact in the right atrium began to disappear) (n=20, group D).Subjective image quality was independently assessed by two radiologists. The total effective dose (including premonitoring, monitoring scanning and angiographic scanning) were calculated.

RESULTS

All prospective ECG-triggering DSCT angiographic scans were successful. The image quality scores of groups A, B, C and D were 3.20±1.06, 3.10±1.12, 3.40±1.30, 4.15±0.81, respectively, there were significant differences among the four groups (p=0.012). The total effective dose of groups A, B and C were (0.40±0.06)mSv, (0.56±0.14)mSv, (0.38±0.06)mSv, (0.39±0.09)mSv, respectively, there were significant differences among 4 groups (p=0.023).

CONCLUSION

The scanning protocol has a significant impact on the image quality with a significantly different radiation dose. Considered the image quality and radiation dose together, the optimal scanning protocol for patient with TOF was the "manual" bolus-tracking technique.

CLINICAL RELEVANCE/APPLICATION

"Manual" bolus-tracking technique is an excellent scanning protocol for TOF patients.

RC651-07 Minimizing Sedation and Radiation in Pediatric Cardiovascular Imaging

Thursday, Dec. 3 9:40AM - 10:00AM Location: S102D

Participants
Rajesh Krishnamurthy, MD, Houston, TX (*Presenter*) Research support, Koninklijke Philips NV; Research support, Toshiba Corporation

LEARNING OBJECTIVES

View learning objectives under main course title.

RC651-08 Minimizing Sedation in Pediatric Abdominal and Musculoskeletal MRI

Thursday, Dec. 3 10:20AM - 10:40AM Location: S102D

Participants
Shreyas S. Vasanawala, MD, PhD, Palo Alto, CA (*Presenter*) Research collaboration, General Electric Company; Consultant, Arterys; Research Grant, Bayer AG;

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Sedation for pediatric MRI has multiple disadvantages. It confers risk of adverse events for what is an otherwise non-invasive procedure. Additionally, sedation contributes to cost, makes exam scheduling complex, and leads to inefficient imaging utilization. This presentation will present some approaches to reduce the incidence, duration, and depth of sedation for pediatric abdominal and musculoskeletal indications.An overview of child developmental approaches that reduce the incidence of sedation will be given. Then an approach for compact protocols to minimize duration of sedation will be presented. This will be followed by discussion of methods of managing respiratory motion artifacts without periods of suspended respiration, thus reducing depth of anesthesia.

RC651-09 High-pitch Low-dose Whole Body CT for the Assessment of Ventriculo-peritoneal Shunts in Pediatric Patients: An Experimental ex-Vivo Study in a Rabbit Model

Thursday, Dec. 3 10:40AM - 10:50AM Location: S102D

Participants
Ahmed E. Othman, MD, Tuebingen, Germany (*Presenter*) Nothing to Disclose
Saif Afat, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Rastislav Pjontek, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Marc A. Brockmann, MD, Luebeck, Germany (*Abstract Co-Author*) Nothing to Disclose
Omid Nikoubashman, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose

Konstantin Nikolaou, MD, Tuebingen, Germany (*Abstract Co-Author*) Speakers Bureau, Siemens AG Speakers Bureau, Bracco Group Speakers Bureau, Bayer AG
Martin Wiesmann, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the sensitivity of whole-body Low-Dose CT (LD-CT) in pediatric patients, regarding the detection of ventriculo-peritoneal shunt (VP-shunt) complications in comparison to radiographic shunt series (SS), with special regards to radiation exposure, using an ex vivo rabbit model.

METHOD AND MATERIALS

In a first step, an optimized low dose CT imaging protocol, with low tube voltages (70 kVp and 80 kVp) was assessed on a 16 cm phantom regarding signal-to-noise ratio (SNR) and radiation dose (with and without iterative reconstruction). After defining the CT protocol with the lowest possible radiation dose, 12 VP-shunts were implanted in 6 rabbit cadavers (weight, 4 - 6 kg). 24 mechanical complications (extracranial and extraperitoneal malpositioning, breakages, disconnections) were induced in 6 VP-shunts. LD-CT scans with the lowest possible radiation doses (80 kVp; 4 mAs) as well as conventional SS were acquired. Blinded readings on image quality and diagnostic accuracy regarding shunt complications as well as radiation dose estimations were performed.

RESULTS

For the detection of shunt complications, LD-CT yielded a sensitivity of 1.0 for both readers. SS yielded a sensitivity of 0.79 for reader A and 0.71 for reader B with moderate agreement (kappa=0.56) (Figure). No false positive findings were registered. Mean effective radiation doses for LD-CT were as low as 0.069 ± 0.003 mSv and therefore comparable to reported doses for SS (0.047 mSv - 0.086 mSv).

CONCLUSION

LD-CT allows accurate detection of VP-shunt complications in pediatric patients with higher sensitivity than SS and comparably low radiation exposure. Thus, LD-CT provides a potentially superior alternative to radiographic shunt series for imaging VP-shunts.

CLINICAL RELEVANCE/APPLICATION

The improvement of accurate diagnostic tools such as LD-CT might potentially reduce time-to-diagnosis and patient turnaround time and might therefore improve the poor outcome and quality of life for children with shunted hydrocephalus.

RC651-10 Application of T1-weighted BLADE Sequences to Abdominal MR Imaging of Young Children: Comparison with Turbo Spin Echo Sequence

Thursday, Dec. 3 10:50AM - 11:00AM Location: S102D

Participants
Kyusung -. Choi, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Young Hun Choi, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jung-Eun Cheon, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ji-Eun Park, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyun Suk Cho, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yu Jin Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Woo Sun Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
In-One Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the usefulness of T1-weighted BLADE sequences for axial T1-weighted abdominal imaging in small children who cannot hold their breath.

METHOD AND MATERIALS

Two different BLADE sequences with (IR-BLADE) and without inversion pulse (BLADE) were compared to TSE with six number of signal acquired (NSA) in fifteen consecutive pediatric patients (mean age of 4.4 years, range 0.5-8 years) who were incapable of holding their breath. The overall image quality, motion artifact, radial artifact, sharpness of hepatic vessels, renal corticomedullary differentiation and lesion conspicuity were retrospectively assessed by two radiologists in a qualitative manner, using four or five-point scaled scoring systems. Signal variations of each sequence were measured in the liver, muscle and air for quantitative comparison. The acquisition times of three sequences were compared.

RESULTS

IR-BLADE and BLADE showed improved overall image quality and reduced motion artifact compared with TSE ($p<0.01$). IR-BLADE showed better edge sharpness of hepatic vessels and corticomedullary differentiation, compared with both BLADE and TSE ($p<0.001$). Radial artifacts were only observed on IR-BLADE and BLADE. In seven patients with lesions, IR-BLADE showed improved lesion conspicuity, compared with both BLADE and TSE ($p=0.023$). Both IR-BLADE and BLADE showed decreased signal variation in the liver, muscle and increased signal variation in the air, compared with the TSE. The mean acquisition times for IR-BLADE, BLADE and TSE were 3min 47s, 3min 32s, and 3min 26s respectively.

CONCLUSION

Application of BLADE technique with inversion pulse for the T1-weighted MR imaging of the pediatric abdomen resulted in improved image quality, tissue contrast and lesion conspicuity with a diminished respiratory motion artifact and a comparable acquisition time, compared with the conventional TSE sequence.

CLINICAL RELEVANCE/APPLICATION

IR-BLADE could be a promising alternative to conventional TSE sequence for T1-weighted abdominal imaging of small children.

RC651-11 Performing Screening Lumbar Spine MRIs in Infants without Sedation - The L-Spine Feed and Sleep

Thursday, Dec. 3 11:00AM - 11:10AM Location: S102D

Participants
Nicholas V. Stence, MD, Aurora, CO (*Presenter*) Nothing to Disclose
Patrick T. McCormick, MD, Aurora, CO (*Abstract Co-Author*) Nothing to Disclose
David M. Mirsky, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Laura Z. Fenton, MD, Greenwood Village, CO (*Abstract Co-Author*) Nothing to Disclose
John D. Strain, MD, Greenwood Village, CO (*Abstract Co-Author*) Nothing to Disclose
John A. Maloney, MD, Denver, CO (*Abstract Co-Author*) Nothing to Disclose
Brent O'Neill, MD, Aurora, CO (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The feed and sleep technique is used in infants to avoid general anesthesia during MRI. The method typically involves fasting an infant prior to exam, feeding and swaddling immediately before scanning until asleep. This technique is commonly used in children's hospitals for neonatal brain MRI, and has been described in the literature in brain and cardiac MRIs. We describe the application of this technique in our institution to outpatient screening lumbar spine MRIs ordered for sacral dimples in children less than 6 months of age.

METHOD AND MATERIALS

This project was undertaken as an internal quality improvement project and therefore did not require IRB approval. The departmental Montage database (Montage Healthcare Solutions) was queried for the number of outpatient, non-contrast lumbar spine MRI exams performed in infants less than 6 months of age over the last 5 years. The number of exams performed as non-sedated feed and sleeps was extracted.The feed and sleep method is performed as follows: Infants are scheduled for exams between 7 p.m. and 9 p.m. Parents are instructed to keep the child awake and fasted for 3-4 hours prior to arrival in the department. On arrival, the MRI technologist aids the parents with swaddling and feeding the infant. Once the child is asleep, they are placed in the scanner and provided ear protection with both a headset and a Philips foam acoustic shield.

RESULTS

From January 2009 through January 2014, 111 of 342 (32%) of outpatient screening lumbar spine MRIs were successfully performed using the feed and sleep method, compared to 52 of 98 (53%) exams performed March 2014 through March 2015. The average age of successful feed and sleep exams in the last year was 3.3 months. Over the last year, approximately 10% of the exams attempted as feed and sleeps required rescheduling with general anesthesia after the attempt was unsuccessful.

CONCLUSION

Our institution was able to avoid the use of general anesthesia in 52 of 98 infants who required a screening lumbar spine MRI for sacral dimples. The successful use of this method has increased over the past 5 years. This is likely due to increased MRI technologist confidence and skill with the technique, as well as an increasing awareness of this technique among referring clinicians.

CLINICAL RELEVANCE/APPLICATION

Wider application of this technique could lead to a reduction in general anesthesia for this type of exam, leading to decreases in cost and risk to the patient.

RC651-12 A Retrospective Analysis of the Safety and Cost Implications of Pediatric Contrast Enhanced Ultrasound in a Single Centre

Thursday, Dec. 3 11:10AM - 11:20AM Location: S102D

Participants
Gibran Yusuf, MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose
Maria E. Sellars, MD, FRCR, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Annamaria Deganello, MD, London, United Kingdom (*Abstract Co-Author*) Speaker, Bracco Group
David O. Cosgrove, MBBCh, FRCR, London, United Kingdom (*Abstract Co-Author*) Research Consultant, SuperSonic Imagine; Research Consultant, Bracco Group; Speakers Bureau, Toshiba Corporation
Paul S. Sidhu, MRCP, FRCR, London, United Kingdom (*Abstract Co-Author*) Speaker, Bracco Group; Speaker, General Electric Company

PURPOSE

There are concerns over increasing use of ionising radiation in children. Contrast enhanced ultrasound (CEUS) offers a cheaper radiation free alternative licensed in adults, widely used in Europe for liver assessment but used "off-label" in non-liver indications. Pediatric CEUS is "off label", and safety has not been assessed. We retrospectively analyse the prevalence of adverse incidents in a cohort of paediatric CEUS and investigate the financial implication of subsequent reduced CT and MR imaging.

METHOD AND MATERIALS

Pediatric (≤18 yrs) CEUS examinations (January 2008 and March 2015) were analysed. Parental informed consent was obtained and any reaction considered related to the contrast examination was documented in the radiology report, with electronic patient records examined for reactions ≤24hrs. Using tariffs calculated from National Institute of Clinical Excellence (UK) analysis; CEUS cost ($168) was compared to the cost for CT ($172) and MR ($280) imaging, the normal diagnostic imaging pathway. The possible reduction in cost when CEUS would have precluded further imaging was calculated.

RESULTS

240 paediatric CEUS were performed (144 male, 96 female, age range 1-18 years). The majority of studies were performed for characterising liver lesions (123/240; 51%) and trauma (86/240; 36%), with renal and vascular assessment the remaining. There were no immediate adverse reactions. Two patients (2/240; 0.8%) experienced delayed adverse reactions of transient hypertension (n=1) and transient tachycardia (n=1) deemed not due to the underlying disorder; neither were symptomatic.

CONCLUSION

CEUS in children is "off label"; however, our experience shows paediatric CEUS is both safe and can offer a cost-effective imaging

modality.

CLINICAL RELEVANCE/APPLICATION

CEUS in paediatrics offers a safe, cost effective alternative to MR and CT imaging in a variety of settings without the risk of ionising radiation, iodinated contrast or risks of sedation which may otherwise be needed.

RC651-13 Sonographic Evaluation of MAGEC Growing Scoliosis Rods in Pediatric Patients

Thursday, Dec. 3 11:20AM - 11:30AM Location: S102D

Participants
Sara M. O'Hara, MD, Cincinnati, OH (*Presenter*) Author, Reed Elsevier; Stockholder, Reed Elsevier; Speakers Bureau, Toshiba Corporation; Medical Advisory Board, Toshiba Corporation
Peter F. Sturm, MD, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Sarah E. Gilday, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Adjustable, magnetically controlled "growing" scoliosis rods (MAGEC rods) are increasingly used in pediatric patients, and require periodic adjustments and confirmation of lengthening following this non-invasive procedure. Previously, adjustable rods required open surgical procedures for lengthening. The purpose of our study was to determine if these MAGEC rods could be adequately visualized and measured with ultrasound, thereby minimizing radiation exposure from serial spine X-rays.

METHOD AND MATERIALS

All patients with recently implanted MAGEC rods were examined with ultrasound before and after their first transcutaneous magnetic rod lengthening procedures. Measurements obtained sonographically were compared with baseline scoliosis X-rays and the length programmed into the magnetic motor used to extend the rod. Measurements will also be compared with scoliosis X-rays obtained once or twice each year.

RESULTS

12 patients have been studied to this point (3 month period) - 6 female, and 6 male, between 6 and 10 years of age. All of the MAGEC rod components including extension motors and expandable rod segments were well visualized sonographically before and after lengthening procedure. All of the patients showed good correlation between post-op scoliosis measurements and first, pre-lengthening ultrasound measurements. 4 of the 13 patients rods showed less lengthening than expected based on the length programmed into the magnetic motor driver. All patients will be re-imaged in the next few months to quantify measurement reliability and compare with expected extension parameters.

CONCLUSION

MAGEC rods can be reliably imaged with ultrasound before and after transcutaneous lengthening procedures, thereby reducing radiation exposure. In addition, the ultrasound may offer additional confidence that the rods have in fact extended the length programmed into the magnetic motor.

CLINICAL RELEVANCE/APPLICATION

Ultrasound should be the preferred method for serial imaging of MAGEC adjustable scoliosis rods in pediatric patients to minimize exposure to ionizing radiation.

RC651-14 Low Dose Pediatric Chest CT: Radiation Dose Comparison of a 70 kVp CT Protocol and a 100 kVp Protocol Using a Tin Filter for Spectral Beam Shaping

Thursday, Dec. 3 11:30AM - 11:40AM Location: S102D

Participants
Meike Weidner, Mannheim, Germany (*Presenter*) Nothing to Disclose
Thomas Henzler, MD, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Holger Haubenreisser, Mannheim, Germany (*Abstract Co-Author*) Speaker, Siemens AG; Speaker, Bayer AG
Mathias Meyer, Mannheim, Germany (*Abstract Co-Author*) Speaker, Siemens AG; Speaker, Bracco Group
Sonja Sudarski, MD, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Stefan O. Schoenberg, MD, PhD, Mannheim , Germany (*Abstract Co-Author*) Institutional research agreement, Siemens AG
Wolfgang Neff, MD, PhD, Alzey, Germany (*Abstract Co-Author*) Nothing to Disclose
Claudia Hagelstein, MD, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

With the introduction of 3rd generation dual-source CT two competetive techniques for further radiation dose reduction became clinically available. On the one hand the CT peak tube voltage can be decreased down to 70 kVp whereas on the other hand 100 kVp imaging can be combined with a dedicated 0.6 mm tin (Sn) filter behind the x-ray tube in order to filter-out low energy photons. We aimed to compare radiation dose in pediatric chest CT scans between 70kV and 100kVp-Sn acquisitions.

METHOD AND MATERIALS

All chest CT examinations were performed on a 3rd generation 2 x 192 slice dual source system (Somatom Force, Siemens Healthcare, Germany) using a pitch factor of 3.2 and automatic tube current modulation without any sedation. In total, 46 examinations were included in this study (mean age 5.8±5.9 years, 70kV n=26; 100Sn n=20). Radiation dose was compared by the CT dose index (CTDIvol), effective dose (ED) after ICRP guideline 103 and organ doses. The latter were calculated with commercially available software (Radimetrics, Bayer, Germany). Signal to noise ratio (SNR) was calculated for lung tissue.

RESULTS

CTDIvol was significantly lower in the 100 kVp-Sn examinations (0.26±0.13 mGy) when compared to 70kVp (0.81±0.73 mGy; $p<0.0001$). Accordingly, mean effective dose was significantly reduced when using 100 kVp-Sn (0.30±0.09 mSv) compared to 70kVp acquisitions (0.84±0.54 mSv; $p<0.0001$; Fig. 1). Organ doses were also significantly lower with the 100 kVp-Sn protocol

compared to the 70kVp protocol, e.g. breast dose with 100 kVp-Sn was 0.49 mSv vs. 1.57 mSv with 70kV, resulting in a factor of 3.2 ($p<0.0001$). SNR in lung tissue was comparable between both examination protocols ($p=0.1$).

CONCLUSION

Both, tube voltage reduction to 70kV and Sn-filter based spectral shaping at 100kVp allow to acquire pediatric chest CT scans at sub-mSv dose levels. In direct comparison 100Sn even performs at lower dose levels. Consequently, chest CT scans without contrast agent should be performed with this technique.

CLINICAL RELEVANCE/APPLICATION

Pediatric chest CT scans can be performed with sub-mSv dose levels when using either 70kVp tube voltage or spectral beam shaping with an additional tin filter at 100kVp (100 kVp-Sn). All pediatric chest CT scans without contrast agent should be acquired with 100 kVp-Sn.

RC651-15 Comparative Assessment of New Generation CT Scanners for Pediatric Applications

Thursday, Dec. 3 11:40AM - 12:00PM Location: S102D

Participants
Whal Lee, MD, PhD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Reviewing the mechanical development of CT machines. 2) Comparative Assessment of New Generation CT Scanners. 3) Knowing new applications and new pitfalls in scanning in children.

ABSTRACT

Computed tomography scanner was introduced at 1974. The scan was sequential at that time, in which the gantry made a complete rotation to acquire an image of a slice.This conventional step-and-shoot technique needed a long scan time because of the interscan delays between the slices. In the late 1980's and early 1990's, spiral scanners were introduced. The gantry continuously rotates, while the table is continuously moving. This spiral scanning allowed fast and continuous acquisition of a complete set of volume image data. In 1998, multi-detector technology was announced with first 4 channels MDCT. Since then, the number of rows of detectors has ever increased, 8, 16, 64, 128 and reaching 320 in 2008. The fast rotation speed of gantry is essential for imaging of an organ. The gantry rotation times have been fast up to 270 msec. There is a machine of two X-ray tube and two detector systems in a gantry which allow only one forth rotation enough to make a slice of image and high pitch fast scanning. The wide detector CT and high pitch scanning is fascinating imaging method for child to overcome motion artifact and reducing radiation dose. However, we have to know the pitfalls in these new scan mode. The overscan range is larger than that of past and wide beam angle of wide detector scanner gave us geometrical unused radiation and that cannot be neglected. In this lecture we will review the mechanical development of CT machines and new applications and new pitfalls in scanning in children.

Active Handout:Whal Lee

http://abstract.rsna.org/uploads/2015/14044487/RC651-15 new CT ped app handout.pdf

RC652

Techniques for Interventional Sonography and Thermal Ablation (Hands-on)

Thursday, Dec. 3 8:30AM - 10:00AM Location: E264

US IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Patrick Warren, MD, Columbus, OH (*Moderator*) Nothing to Disclose
Veronica J. Rooks, MD, Honolulu, HI (*Presenter*) Nothing to Disclose
Corrie M. Yablon, MD, Ann Arbor, MI, (cyablon@med.umich.edu) (*Presenter*) Nothing to Disclose
Andrada R. Popescu, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Linda J. Warren, MD, Vancouver, BC (*Presenter*) Shareholder, Hologic, Inc
Hisham A. Tchelepi, MD, Los Angeles, CA (*Presenter*) Research Grant, General Electric Company; Research Grant, Roper Industries, Inc
John M. Racadio, MD, Cincinnati, OH (*Presenter*) Research Consultant, Koninklijke Philips NV; Travel support, Koninklijke Philips NV
Mahesh M. Thapa, MD, Seattle, WA (*Presenter*) Nothing to Disclose
Kristin M. Dittmar, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Adam S. Young, MD, MBA, Boston, MA (*Presenter*) Nothing to Disclose
Stephen C. O'Connor, MD, Springfield, MA (*Presenter*) Nothing to Disclose
Kal Dulaimy, MD, Springfield, MA (*Presenter*) Nothing to Disclose
Christian L. Carlson, MD, MS, Cibolo, TX (*Presenter*) Nothing to Disclose
Andrew J. Rabe, DO, Columbus, OH (*Presenter*) Nothing to Disclose
Jeremiah J. Sabado, MD, Columbus, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify basic skills, techniques, and pitfalls of freehand invasive sonography. 2) Discuss and perform basic skills involved in thermal tumor ablation in a live learning model. 3) Perform specific US-guided procedures to include core biopsy, abscess drainage, vascular access, cyst aspiration, soft tissue foreign body removal, and radiofrequency tumor ablation. 4) Incorporate these component skill sets into further life-long learning for expansion of competency and preparation for more advanced interventional sonographic learning opportunities.

ABSTRACT

Ultrasound Guided Foreign Body Removal: Simulation Training and Clinical implementation Outcomes ; Purpose: USFBR can be taught to radiologists to generate competency, and radiologists can apply the technique in the patient setting to remove foreign bodies. ; Materials and Methods: Proof of concept was performed by a radiologist and surgeon removing nine 1-cm foreign bodies using the USFBR method (P) and traditional surgery (S) with and without wire guidance (W) on the cadaver model. ; Next, USFBR was taught to 48 radiologists at 4 hospitals. Training included didactic and hands-on instruction covering 7 components: instrument alignment, hand/transducer position, forceps use, foreign body definition, forceps grasp, recognition of volume averaging, and oblique cross cut artifact. Pre-training testing assessed single toothpick removal from turkey breast in 15 minutes.; Post-training evaluation consisted of 5 toothpick removals. ; Ongoing clinical implementation data of USFBR by trained radiologists are being collected. Parameters including age of patient, which radiologist, removal success, type and size of foreign body, incision size, foreign body retention time, reason for removal, symptoms, modalities used in detection, wound closure, and sedation are recorded. Data analyzed using chi-squared and Fisher#39;s exact tests for categorical outcomes and analysis of variance for continuous outcomes. ; Results: USFBR technique shows a higher success rate and smaller incision size in comparison to surgical technique alone in the cadaver. Removal success: P 100%, S 78%, and W 89%. ; With USFBR training, radiologists; scores improved from 21-52% pre-training to 90-100% post-training (p;0.001 for each component). In the clinical setting to date, USFBR has been 100% successful in 7 (of 25 expected) patients, ages 9-73 years, by four radiologists. Parameters included; length 4 to 30 mm, retention 2 to 864 days, incision, 2 to 8 mm. 1 suture closure. 1 sedation. ;

RC653

Managing Radiology IT in the EHR World

Thursday, Dec. 3 8:30AM - 10:00AM Location: S502AB

IN LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
J. R. Geis, MD, Fort Collins, CO (*Moderator*) Advisor, Nuance Communications, Inc; Investor, Montage Healthcare Solutions; Vice Chair, ACR IT Informatics Commission

LEARNING OBJECTIVES

1) Identify EHR components relevant to radiology. 2) Understand how to assess and use those components to your advantage. 3) Discover potential and pitfalls of EHRs.

ABSTRACT

Sub-Events

RC653A EHR/RIS Optimization of Imaging Workflow for the Enterprise

Participants
Peter B. Sachs, MD, Aurora, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the typical radiology department work flow in an EMR environment. 2) Identify the key work flow items that may require optimization. 3) Identify the key components necessary to carry out optimization. 4) Review examples of optimaztions carried out at the author's institution. 5) Discuss the impact these optimizations have had on radiology workflow/efficiency and patient care.

ABSTRACT

The development and deployment of electronic medical records has resulted in a significant impact on radiology work flow both postive and negaitve. Moving from paper driven to an electronic processes requires a highly functional, multi-disciplinary team to address break-fixes as well as optimizations. This presentation will review the optimal structure of the team and then discuss the requisite skill sets of the team members to insure gettting the most out of the EHR to drive high quality, efficient, patient-centered work flow in the radiology departmen.

RC653B RIS-EMR Driven Workflow for Diagnostic Radiologists - You Might Actually Want This

Participants
Cree M. Gaskin, MD, Keswick, VA (*Presenter*) Author with royalties, Oxford University Press; Author with royalties, Thieme Medical Publishers, Inc; ;

LEARNING OBJECTIVES

1) Present EHR driven workflow for the diagnostic radiologist at the speaker's institution. 2) Discuss radiologist engagement in EHR implementation for radiology-centric optimization. 3) Discuss impacts of EHR driven workflow on diagnostic radiologists' efficiency and quality of care delivery as well as user satisfaction.

ABSTRACT

Electronic Health Records (EHRs) are touted to improve the quality and efficiency of clinical care. As a result, EHR-meaningful use legislation has been passed in the U.S. to financially incentivize adoption of this technology. Still, some radiologists remain skeptical that the benefits of EHRs are applicable to their practice and some fear that the technology could even unnecessarily complicate their workflow.One newer model for integrating EHRs into radiologists' practice is to use an EHR to drive diagnostic radiologist workflow, rather than the more traditional or widespread models of PACS driven or third-party RIS driven workflow. This newer model provides opportunity to leverage EHR technology and data for the benefit of radiology-related care delivery. This presentation shares a radiologist-centric viewpoint from one institution which has successfully adopted EHR-driven workflow for diagnostic radiologists. Though the process of implementation is touched upon, the presentation focuses on the resultant clinical workflow and the impacts on quality, efficiency, and radiologist satisfaction.

RC653C PACS and Radiologist Workflow in a Multi-Enterprise Environment

Participants
Gary J. Wendt, MD, MBA, Middleton, WI (*Presenter*) Medical Advisory Board, McKesson Corporation; Medical Advisory Board, HealthMyne; Owner, WITS(MD), LLC; ;

LEARNING OBJECTIVES

1) Understand workflow challenges for a radiologist operating a multi-enterprise environment. 2) Understanding requirements for environments with a single versus multiple medical record numbers a. PACS b. Dictation systems c. EHR. 3) Using a master patient index to link patient's across sites.

ABSTRACT

As a radiology department expands across multiple organizations there are several challenges that are created. Among these is the capability of the PACS, dictation systems and electronic medical record to operate in a single versus a multiple medical record

number environment. These challenges are complicated further if there is no master patient index to link patient's across the multiple sites. All of these need to be taken into consideration prior to attempting to deploy a single workflow solution in multiple environments. Some possibilities that are discussed include using systems that function in a multiple medical record number environment, making changes to the demographic information in an interface engine or simply guaranteeing that each site uses unique identifiers. The benefits of having a single workflow solution across multiple environments is significant and helps to justify the cost of implementing in maintaining this type of environment.

RC654

Decision Support for Radiologists at the Time of Reporting

Thursday, Dec. 3 8:30AM - 10:00AM Location: S103CD

IN SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Charles E. Kahn JR, MD, MS, Philadelphia, PA, (charles.kahn@uphs.upenn.edu) (*Moderator*) Nothing to Disclose

Sub-Events

RC654A Structured Reporting

Participants
Charles E. Kahn JR, MD, MS, Philadelphia, PA, (charles.kahn@uphs.upenn.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the RSNA's initiative to create a repository of radiology report templates. 2) Explore new information standards for representing and exchanging report templates. 3) Discuss how report templates can increase compliance with practice guidelines. 4) Describe new opportunities to incorporate decision support into radiology reporting.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Charles E. Kahn JR, MD, MS - 2012 Honored Educator

RC654B Improving the Quality of Follow-up Recommendations

Participants
Tarik K. Alkasab, MD, PhD, Boston, MA, (talkasab@mgh.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe how informatics tools such as computer-assisted reporting/decision support can lead to more consistent radiologist recommendations for follow-up. 2) Describe how informatics tools will permit creation of 'structured recommendations'. 3) Discuss how these 'structured recommendations' can be used by downstream informations systems.

RC654C Enabling Evidence-based Recommendations in Radiology Reports

Participants
V. Anik Sahni, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the importance of evidence-based recommendations in radiology reports. 2) Explore the IT solutions available to integrate evidence-based recommendations into radiology reports. 3) Discuss tools available to monitor consistency and compliance of recommendations.

RCA51

3D Printing (Hands-on)

Thursday, Dec. 3 8:30AM - 10:00AM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Moderator*) Research Grant, Toshiba Corporation;
Frank J. Rybicki III, MD, PhD, Ottawa, ON (*Presenter*) Research Grant, Toshiba Corporation;
Jane S. Matsumoto, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Jonathan M. Morris, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Dimitris Mitsouras, PhD, Boston, MA (*Presenter*) Research Grant, Toshiba Corporation; Speakers Bureau, Toshiba Corporation
Andreas Giannopoulos, MD, Boston, MA, (agiannopoulos1@partners.org) (*Presenter*) Nothing to Disclose
Nicole Wake, MS, New York, NY (*Presenter*) Nothing to Disclose
Peter C. Liacouras, PhD, Bethesda, MD (*Presenter*) Nothing to Disclose
Thomas A. Foley, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Kiaran P. McGee, PhD, Rochester, MN (*Presenter*) Nothing to Disclose
Michael W. Itagaki, MD, MBA, Seattle, WA (*Presenter*) Owner, Embodi3D, LLC
Shannon N. Zingula, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Leonid Chepelev, MD,PhD, Ottawa, ON (*Presenter*) Nothing to Disclose
Adnan M. Sheikh, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
AiLi Wang, Ottawa, ON (*Presenter*) Nothing to Disclose
Wilfred Dang, BS, Ottawa, ON (*Presenter*) Nothing to Disclose
Ekin P. Akyuz, BSc, Ottawa, ON (*Presenter*) Nothing to Disclose
Taryn Hodgdon, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Carlos H. Torres, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Anji Tang, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn the Standard Tessellation Language (STL) file format that is used in 3D priting. 2) Be exposed to a software package to enable segmentation of DICOM images using semi-automated and manual segmentation algorithms, allowing the user to demarcate desired parts. The most commonly used tools are thresholding, region growing, and manual sculpting. 3) Learn refinement of an output STL output so that it can be optimized for accurate printing of the desired anatomy and pathology. This step uses Computer Aided Design (CAD) software is used to perform steps such as "wrapping" and "smoothing" to make the model more homogeneous.

ABSTRACT

"3D printing" refers to fabrication of a tangible object from a digital file by a 3D printer. Materials are deposited layer-by-layer and then fused to form the final object. There are several 3D printing technologies that share similarities but differ in speed, cost, and resolution of the product. Digital Imaging and Communications in Medicine (DICOM) image files cannot be used directly for 3D printing; further steps are necessary to make them readable by 3D printers. The purpose of this hands-on course is to convert a set of DICOM files into a 3D printed model through a series of simple steps. Some of the initial post-processing steps may be familiar to the radiologist, as they share common features with 3D visualization tools that are used for image post-processing tasks such as 3D volume rendering. However, some are relatively or completely new to radiologists, including the manipulation of files in Standard Tessellation Language (STL). It is the STL format that is read by the 3D printer and used to output the hand held part of the patient's anatomy. This 90 minute session will begin with a DICOM file and will proceed through the steps to create a printable STL file. An extensive training manual will be provided before the meeting. It is highly recommended that participants review the training manual to optimize the experience at the workstation.

URL

Active Handout:Frank John Rybicki

http://abstract.rsna.org/uploads/2015/14003458/Active RCA13.pdf

RCC51

Quantitative Imaging and Informatics (In Association with the Society for Imaging Informatics in Medicine)

Thursday, Dec. 3 8:30AM - 10:00AM Location: S501ABC

IN BQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Adam E. Flanders, MD, Penn Valley, PA, (adam.flanders@jefferson.edu) (*Moderator*) Nothing to Disclose
Luciano M. Prevedello, MD,MPH, Columbus, OH (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Develop an understanding of what quantitative imaging is and how it may revolutionize the way we practice diagnostic radiology today. 2) Learn the research advances and the current clinical applications of this technology. 3) Appreciate the current challenges involved in using these tools clinically and understand the steps required for a successful clinical implementation.

ABSTRACT

Medicine has undergone a gradual evolution in which diagnostic imaging has become the centerpiece in establishing a clinical diagnosis and in assessing disease response. In recent years, the focus has changed such that for some disease categories (e.g. oncology) we now perceive medical imaging as a phenotypic expression of the genetic makeup of that disease. To that end, imaging now serves as a biomarker of genetic disease subtypes with features that may offer clues to understanding the natural behavior of the disease and specific changes that may occur as part of a therapeutic response. It is now well recognized that there is a substantial amount of objective information contained within diagnostic imaging studies that can be exploited beyond the level of simple measurements. The extraction of quantitative and semi-quantitative information from imaging studies that is both useful and reproducible is the challenge and opportunity for clinical trials research and radiologic reporting today and in the future. This session will explore the revolution and evolution of quantitative imaging; providing attendees with research advances, clinical applications, and the challenges of clinical implementation.

Sub-Events

RCC51A What is Quantitative Imaging?

Participants
Katherine P. Andriole, PhD, Dedham, MA (*Presenter*) Advisory Board, McKinsey & Company, Inc;

LEARNING OBJECTIVES

1) Be able to describe what is meant by quantitative imaging. 2) Understand existing issues in implementing quantitative imaging techniques in the clinical arena as well as in the research realm, and see how informatics tools may help. 3) Be aware of on-going international efforts to address current challenges and to move quantitative imaging forward.

ABSTRACT

Quantitative imaging has rapidly evolved in recent years from a promising research activity to an essential clinical tool. Physicians consider the objective metrics obtained from imaging studies, in making critical patient management decisions. What is meant by quantitative imaging will be described using illustrative real-world use cases. Existing issues including technical as well as workflow challenges will be discussed. An introduction to imaging informatics tools and techniques such as standards, integration, data mining, cloud computing, ontologies, data visualization and navigation tools, and business analytics applications that may assist in filling current gaps in the clinical implementation of quantitative imaging will be given. An overview of activities of the RSNA's Quantitative Imaging Biomarkers Alliance (QIBA), an international initiative whose goal is to optimize the potential of quantitative imaging, including a description of the data warehouse project will be provided.

RCC51B Informatics Approaches to Enable Quantitative Imaging in Real World Radiology Practice

Participants
Daniel L. Rubin, MD, MS, Palo Alto, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To highlight limitations in current radiological quantitative imaging practice and identify opportunities for improvement through informatics. 2) To introduce Annotation and Image Markup (AIM) as a new standard for capturing and sharing quantitative imaging metadata. 3) To demonstrate new AIM-enhanced tools that can streamline and improve quantitative imaging assessment and workflow for the radiologist.

ABSTRACT

Radiology practice is increasingly a quantitative endeavor. Radiologists frequently need to measure the length of lesions to track treatment response or measure the size of structures to for diagnostic assessment. Current practices of quantitation are cumbersome; measurements are recorded as screen captures that cannot be processed by machine, and the numbers must be transcribed into a radiology report. It is currently exceedingly difficult to create structured databases of quantitative image information for discovery about how, say, change in tumor size over time relates to drug treatment. Quantitative imaging is currently at best a labor-intensive process and at worst error-prone. We have been developing informatics methods to streamline the electronic capture of quantitative imaging results as "image metadata" in structured format that can be easily processed by computers. Tools that we are producing will allow the radiologist to perform quantitative imaging assessment in their current routine workflow-measuring lesions on the PACS, while simultaneously their measurements will be captured and transmitted in standardized formats to applications that can automate accurate reporting, analysis, and decision support. In the future such tools will even help researchers to discover new ways that quantitative signals in images can improve assessment of treatment and prediction of

disease course.

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Daniel L. Rubin, MD, MS - 2012 Honored Educator
Daniel L. Rubin, MD, MS - 2013 Honored Educator

RCC51C QI Clinical Use Cases Outside of Oncology

Participants
Eliot L. Siegel, MD, Severna Park, MD (*Presenter*) Research Grant, General Electric Company; Speakers Bureau, Siemens AG; Board of Directors, Carestream Health, Inc; Research Grant, XYBIX Systems, Inc; Research Grant, Steelcase, Inc; Research Grant, Anthro Corp; Research Grant, RedRick Technologies Inc; Research Grant, Evolved Technologies Corporation; Research Grant, Barco nv; Research Grant, Intel Corporation; Research Grant, Dell Inc; Research Grant, Herman Miller, Inc; Research Grant, Virtual Radiology; Research Grant, Anatomical Travelogue, Inc; Medical Advisory Board, Fovia, Inc; Medical Advisory Board, Toshiba Corporation; Medical Advisory Board, McKesson Corporation; Medical Advisory Board, Carestream Health, Inc; Medical Advisory Board, Bayer AG; Research, TeraRecon, Inc ; Medical Advisory Board, Bracco Group; Researcher, Bracco Group; Medical Advisory Board, Merge Healthcare Incorporated; Medical Advisory Board, Microsoft Corporation; Researcher, Microsoft Corporation

LEARNING OBJECTIVES

1) List the current greatest challenges to quantitative imaging from an informatics perspective. 2) Describe how data from clinical trials and the electronic medical record can provide decision support tools associated with the application of quantitative imaging. 3) Be able to articulate the requirements for 'next generation' quantitative imaging and opportunities for improvement of the current generation of CAD software.

ABSTRACT

In the current and future era of Big Data and advanced algorithms to model and diagnose complex disease, structured reporting, natural language processing and quantitative imaging have become essential elements for diagnostic imaging. Additionally it is absolutely essential that our imaging reports including scanning parameters, diagnosis, findings, recommendations, etc. as well as quantitative measurements and impressions from the pixel data be made available for the next generation of diagnostic, staging, and treatment algorithms. Currently there are several major challenges to making these imaging data accessible in a machine recognizable manner and these will be listed, including the application of a method to 'tag' medical images and a means of structuring and classifying findings made by radiologists and other human interpreters as well as computer algorithms that make quantitative measurements and computer aided detection and diagnosis. Once these data are available they can be utilized for decision support in radiology such as determination of which patients should be screened, estimation of the likelihood of malignancy when a nodule is detected, and refinement of CAD algorithms based on a priori estimates of likelihood of disease.

MSRT52

ASRT@RSNA 2015: Patient-centered Imaging and the Role for the RA in a Changing Healthcare Environment

Thursday, Dec. 3 9:15AM - 10:15AM Location: N230

LM PR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Courtney Sullivan, MS, RRA, New York, NY, (cls2007@med.cornell.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define approaches to providing patient-centered care through radiology consultation activities. 2) Identify the value of the role of the registered radiologist assistant in the patient care setting. 3) Understand ways in which radiology consultation can increase the standard of care in a changing healthcare environment.

ABSTRACT

In a changing healthcare environment, the ability to provide patient-centered care has become increasingly more important. Aligning with healthcare reform initiatives, consultation provides an ideal opportunity to promote informed decision making, increase education, and facilitate communication between patients, radiologists and referring physicians. While radiology consultation has traditionally been a part of standard clinical practice, the current fee for service payment model and technologies such as PACS have limited the availability of the radiologist. Through an organized consultation service, the role of the Registered Radiologist Assistant offers potential to help alleviate radiologist workflow constraints that come with participating in non-interpretive tasks. In reviewing this model, this session will focus on radiology consultation and ways to promote patient-centered imaging, ultimately increasing the quality of care that is received.

MSCN52

Case-based Review of Neuroradiology (An Interactive Session)

Thursday, Dec. 3 10:30AM - 12:00PM Location: S100AB

HN NR PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Pina C. Sanelli, MD, Manhasset, NY (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Improve basic knowledge and skills relevant to clinical practice. 2) Practice formulating a differential diagnosis for pathologic diseases involving the brain, spine, head and neck. 3) Apply principles of critical thinking to challenging diagnostic imaging cases.

ABSTRACT

The learning objectives are to enable attendees to:1. Improve basic knowledge and skills relevant to clinical practice.2. Practice formulating a differential diagnosis for pathologic diseases involving the brain, spine, head and neck.3. Apply principles of critical thinking to challenging diagnostic imaging cases.

Sub-Events

MSCN52A Pediatric Brain

Participants
Tina Y. Poussaint, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To select the appropriate modality or modalities in evaluating a suspected or diagnosed case of pediatric CNS disease with focus on MR imaging. 2) To review key MR imaging features of pediatric brain diseases. 3) To evaluate neuroimaging of pediatric CNS disease as it relates to understanding the developing brain in childhood.

ABSTRACT

Pediatric brain diseases will be discussed in a case based format.

MSCN52B Pediatric Spine

Participants
Christopher G. Filippi, MD, Grand Isle, VT, (cfilippi@nshs.edu) (*Presenter*) Research Consultant, Regeneron Pharmaceuticals,Inc; Research Consultant, Syntactx

LEARNING OBJECTIVES

1) Identify the basic anatomic, physiologic and pathologic features of diseases affecting the pediatric spine. 2) Identify the key imaging features of various common pediatric spine diseases. 3) Recognize common patterns for spine and spinal cord pathology and organize these patterns into categories of diseases processes.

ABSTRACT

Common pediatric spine and spinal cord diseases will be discussed in a case-based format.

MSCN52C Pediatric Head and Neck

Participants
Laurie A. Loevner, MD, Gladwyne, PA (*Presenter*) Stockholder, General Electric Company; Stockholder, Pfizer Inc; Stockholder, Merck & Co, Inc; Stockholder, Johnson & Johnson; Stockholder, Amgen Inc; Stockholder, GlaxoSmithKline plc

LEARNING OBJECTIVES

1) Identify the salient imaging features of common pathologies of the pediatric head and neck. 2) Identify pertinent anatomy in the neck and skull base through the illustration of head and neck pathology. 3) Recognize patterns for disease that allow a succinct differential diagnosis. 4) Apply radiologic findings to identify next appropriate steps in patient work-up.

MSCS52

Case-based Review of Musculoskeletal Radiology (An Interactive Session)

Thursday, Dec. 3 10:30AM - 12:00PM Location: S406A

MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Lynne S. Steinbach, MD, San Francisco, CA, (lynne.steinbach@ucsf.edu) (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the application of basic anatomic, pathologic, and physiologic principles to tumors as well as specific disease processes that affect the knee,hip,ankle and foot. 2) Illustrate using case examples of several important disease processes that are characteristic of the chosen topics, using several imaging methods and emphasizing the value of each. 3) Present the major teaching points and differential diagnostic considerations for each of the chosen cases and, when appropriate, clarify the importance of early accurate diagnosis.

ABSTRACT

Accurate diagnosis of many disorders that affect the knee, hip, ankle and foot as well as musculoskeletal tumors can be accomplished with basic or advanced imaging methods, or both. A series of cases will be used to illustrate a few of these disorders, with attention to the most appropriate imaging protocol, the salient imaging findings, the anatomic and pathophysiologic factors that explain the findings, and the important differential

Sub-Events

MSCS52A Tumor

Participants
Mark J. Kransdorf, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

MSCS52B Ankle and Foot

Participants
Donald L. Resnick, MD, San Diego, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSCS52C Knee

Participants
William E. Palmer, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

MSCS52D Hip

Participants
Christian W. Pfirrmann, MD, MBA, Forch, Switzerland (*Presenter*) Advisory Board, Siemens AG; Consultant, Medtronic, Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

MSES52

Essentials of Trauma Imaging

Thursday, Dec. 3 10:30AM - 12:00PM Location: S406B

CH MK NR ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

MSES52A Cervical Spine Trauma

Participants
Peter J. MacMahon, MD, Dublin, Ireland, (pmacmahon@mater.ie) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the stabilizing anatomical structures of the cervical spine. 2) Appraise the indications for the various cervical spine imaging modalities. 3) Classify cervical spinal injuries based on the mechanism of injury and stability. 4) Differentiate the most common cervical spine injuries. 5) Detect subtle soft tissue and bony injuries of the cervical spine.

MSES52B A Simplified Approach to Imaging Acetabular Fractures

Participants
Ustun Aydingoz, MD, Ankara, Turkey, (ustunaydingoz@yahoo.com) (*Presenter*) Speaker, AbbVie Inc; Spouse, Stockholder, Edita Medical Writing Editing Ltd; Spouse, Employee, Edita Medical Writing Editing Ltd;

LEARNING OBJECTIVES

1) Identify the imaginary lines on radiographs to determine the presence of an acetabular fracture. 2) List five most common acetabular fractures that comprise approximately 90% of all. 3) Apply an algorithm to detect the five most common acetabular fractures on radiographs and/or CT. 4) Explain the most relevant information for the clinician regarding imaging assessment of acetabular fractures.

ABSTRACT

Imaging plays an indispensable role in detecting and classifying acetabular fractures. This live activity will focus on: A) identifying acetabular fractures on radiographs and CT, B) using an algorithm to classify the five most common acetabular fractures (that comprise approximately 90% of all), and C) mentioning clinically relevant points on imaging reports to help decision-making for better management of the patient's condition.

Handout:Ustun Aydingoz

http://abstract.rsna.org/uploads/2015/15001876/RSNA2015_MSES52B_Acetabular fx.pdf

MSES52C Blunt Trauma of Lung, Pleura, Airways, and Chest Wall

Participants
Guillermo P. Sangster, MD, Shreveport, LA, (gsangs@lsuhsc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Substantiate the advantages of multidetector computed tomography (MDCT) over Chest x-ray for the initial screening of chest trauma. 2) Identify the MDCT imaging findings of the non-vascular traumatic thoracic injuries.

ABSTRACT

Chest radiography has been the traditional screening technique to evaluate traumatic thoracic injuries. The information obtained is usually sub optimal for the diagnosis of non-vascular thoracic injuries. The benefits of MDCT for its diagnosis are discussed in this live activity. Images from our level I trauma center database are shown, including: A) Thoracic wall injuries: diaphragmatic rupture, sternum and scapular fractures, sterno-clavicular dislocation and flail chest. B) Pleuro-pulmonary injuries: contusion, laceration, herniation, pneumothorax, and hemothorax. C) Intrathoracic traqueo-bronchial laceration.

MSRT53

ASRT@RSNA 2015: 3D Post Processing - Not Just a Pretty Picture

Thursday, Dec. 3 10:30AM - 11:30AM Location: N230

IN

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Adrienne Coya, MS, RRA, New York, NY, (abc2011@med.cornell.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define key 3D post processing terminology and techniques. 2) Identify where 3D post processing can improve diagnostic accuracy on CT and MRI exams. 3) Examine the role of 3D post processing in surgical and treatment course planning.

RCA52

National Library of Medicine: Online Images and Datasets: Options for Research and Presentations (Hands-on)

Thursday, Dec. 3 10:30AM - 12:00PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Holly Ann Burt, MLIS, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify freely available online image databases and data archives including those with online case studies. 2) Use basic searching skills across a variety of databases. 3) Locate copyright options for literature images and radiology datasets.

ABSTRACT

In this hands-on workshop, explore radiographic images and data available online. The National Library of Medicine (NLM) is only one of many agencies which support freely available online image databases and data archives. Topics include searching for journal images, identifying copyright options, and finding case studies or images specifically for patients and families. Use search engines and portals offering a radiology option; discover public data archives and how to search and access datasets; and identify available imaging tools. Learn which databases may be the best starting point for your research.

Handout:Holly Ann Burt

http://abstract.rsna.org/uploads/2015/15004109/2015onlinedatabasesRSNA.pdf

RCB52

Using Keynote: An Alternative to Power Point (Hands-on)

Thursday, Dec. 3 10:30AM - 12:00PM Location: S401CD

ED IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Shawn D. Teague, MD, Indianapolis, IN (*Presenter*) Stockholder, Apple Inc

LEARNING OBJECTIVES

1. Modify the master slides used in a template. 2. Change the aspect ratio for a presentation from 4:3 to 16:9. 3. Utilize movies in a presentation. 4. Utilize the remote control feature in Keynote with a mobile device.

RCC52

Practical Informatics for the Practicing Radiologist: Part Two (In conjunction with the Society for Imaging Informatics in Medicine)

Thursday, Dec. 3 10:30AM - 12:00PM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RCC52A Saving Your Body (and Your Mind): Redesigning the Radiology Reading Environment

Participants
Eliot L. Siegel, MD, Severna Park, MD (*Presenter*) Research Grant, General Electric Company; Speakers Bureau, Siemens AG; Board of Directors, Carestream Health, Inc; Research Grant, XYBIX Systems, Inc; Research Grant, Steelcase, Inc; Research Grant, Anthro Corp; Research Grant, RedRick Technologies Inc; Research Grant, Evolved Technologies Corporation; Research Grant, Barco nv; Research Grant, Intel Corporation; Research Grant, Dell Inc; Research Grant, Herman Miller, Inc; Research Grant, Virtual Radiology; Research Grant, Anatomical Travelogue, Inc; Medical Advisory Board, Fovia, Inc; Medical Advisory Board, Toshiba Corporation; Medical Advisory Board, McKesson Corporation; Medical Advisory Board, Carestream Health, Inc; Medical Advisory Board, Bayer AG; Research, TeraRecon, Inc ; Medical Advisory Board, Bracco Group; Researcher, Bracco Group; Medical Advisory Board, Merge Healthcare Incorporated; Medical Advisory Board, Microsoft Corporation; Researcher, Microsoft Corporation

LEARNING OBJECTIVES

1) Describe three issues with human factors related to the modern reading room. 2) Indicate potential solutions for lighting, ambient noise, and ergonomic challenges.

RCC52B Changing Information Systems: A Survival Guide

Participants
Steven C. Horii, MD, Philadelphia, PA (*Presenter*) Spouse, Employee, Cerner Corporation; ;

LEARNING OBJECTIVES

1) Describe common issues facing departments changing vendors. 2) Explain the techniques that can be used at time of contracting to ensure future access to data. 3) List techniques used for image migration.

RCC52C So Many Images, So Little Time: Advanced Imaging Techniques

Participants
Adam E. Flanders, MD, Penn Valley, PA, (adam.flanders@jefferson.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To appreciate the diversity of advanced visualization techniques.2) To understand how advanced visualization extends the value of medical imaging.3) To learn how advanced visualization has changed traditional workflow strategies.4) To appreciate some of the pitfalls of automation and the need for expert supervised assessment of advanced visualization output.

ABSTRACT

MSRT54

ASRT@RSNA 2015: Renal and Urographic CT Imaging

Thursday, Dec. 3 11:45AM - 12:45PM Location: N230

GU CT

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Robert C. Chatelain, RT, Ottawa, ON (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To identify normal anatomy and its variants demonstrated by CT of the urinary system. 2) To explain the value of having specific dedicated protocols for the renal and urographic imaging. 3) To differentiate renal and urographic pathologies by origin (congenital, neoplastic, vascular etc.)

ABSTRACT

The urinary system is subject to a wide variety of pathological processes and anatomical variants. Fortunately, it lends itself well to being imaged by a range of modalities. This presentation will focus on the imaging of the urinary system using Computed Tomography (CT). Due to high spatial resolution, CT is an excellent tool to evaluate stones, masses, traumatic injuries and infections. Non contrast CT is the procedure of choice to evaluate kidney stones. CT is also used to differentiate malignant from nonmalignant renal masses, to evaluate the local spread of a renal malignancy and CT angiography (CTA) is an excellent tool to define the anatomy of the renal arteries and veins.

RCA53

National Library of Medicine: Find Articles You Need: Searching PubMed/MEDLINE Efficiently (Hands-on)

Thursday, Dec. 3 12:30PM - 2:00PM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Marilia Y. Antunez, MA, Fredonia, NY (*Presenter*) Nothing to Disclose
Holly Ann Burt, MLIS, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how PubMed constructs a query and how to develop and refine effective search strategies in radiology. 2) Use PubMed tools including Clinical Queries, Related Articles, Single Citation Matcher and Loansome Doc. 3) Build focused searches using the Medical Subject Headings (MeSH) vocabulary for radiology and limit searches to radiology-oriented journals. 4) Understand how to save and download citations.

ABSTRACT

This hands-on workshop covers key searching techniques, changes to PubMed, and how to develop effective search strategies for PubMed and MEDLINE. Topics covered include: why keywords don't always give the results you expect, how to limit to specific journals, quick searches to find evidence-based citations, how to access full-text articles, and downloading citations to reference manger programs. The National Library of Medicine (NLM) provides free web access to nearly 24 million citations for biomedical and clinical medical articles through PubMed (available online at PubMed.gov). MEDLINE is a subset of PubMed which includes links to sites providing full text articles and to other related databases and resources.

URL

Handout:Holly Ann Burt

http://abstract.rsna.org/uploads/2015/14003436/2015pubmedRSNA.pdf

RCC53

Next Generation Infrastructure for Medical Imaging (In Association with the Society for Imaging Informatics in Medicine)

Thursday, Dec. 3 12:30PM - 2:00PM Location: S501ABC

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Paul J. Chang, MD, Chicago, IL, (pchang@radiology.bsd.uchicago.edu) (*Moderator*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Medical Advisory Board, lifeIMAGE Inc; Medical Advisory Board, Merge Healthcare Incorporated

LEARNING OBJECTIVES

1) The participant will be introduced to the importance of information system integration and interoperability to support modern imaging informatics workflow. 2) Examples of practical integration strategies that have been used successfully (e.g. web viewer EHR integration, single sign-on, RIS vs PACS driven workflow) will be discussed. 3) Advanced integration strategies, including using vendor APIs, state aggregation, SOA, and IHE, will be presented.

ABSTRACT

Modern imaging informatics workflow requires consumption, choreography, and orchestration of content from multiple disparate information systems that do not natively "talk to each other." Without optimal integration and interoperability amongst these systems, humans are required to serve as "integrating agents:" this frequently results in inefficiency and error. This session will provide an introduction to the importance of system integration and will provide a practical introduction to commonly used integration strategies. In addition, more advanced integration approaches, including leveraging vendor APIs (application programming interfaces), IHE, and SOA (service oriented architecture) will be discussed.

Sub-Events

RCC53A Interoperability and Integration-from HL7, DICOM, IHE, to SOA

Participants
Paul J. Chang, MD, Chicago, IL, (pchang@radiology.bsd.uchicago.edu) (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Medical Advisory Board, lifeIMAGE Inc; Medical Advisory Board, Merge Healthcare Incorporated

LEARNING OBJECTIVES

1) The participant will be introduced to the importance of information system integration and interoperability to support modern radiology workflow. 2) Examples of practical integration strategies that have been used successfully (e.g. web viewer EHR integration, single sign-on, RIS vs PACS driven workflow) will be discussed. 3) Advanced integration strategies, including using vendor APIs, state aggregation, SOA, and IHE, will be presented.

ABSTRACT

Modern radiology workflow requires consumption, choreography, and orchestration of content from multiple disparate information systems that do not natively "talk to each other." Without optimal integration and interoperability amongst these systems, humans are required to serve as "integrating agents:" this frequently results in inefficiency and error. This session will provide an introduction to the importance of system integration and will provide a practical introduction to commonly used integration strategies. In addition, more advanced integration approaches, including leveraging vendor APIs (application programming interfaces), IHE, and SOA (service oriented architecture) will be discussed.

RCC53B Image Sharing-A Fond Farewell to CDs

Participants
David S. Mendelson, MD, Larchmont, NY (*Presenter*) Spouse, Employee, Novartis AG; Advisory Board, Nuance Communications, Inc; Advisory Board, General Electric Company; Advisory Board, Toshiba Corporation

LEARNING OBJECTIVES

1) Understand the importance of Image Sharing / Exchange with regard to the quality of care a radiologist delivers as well as to efforts to control costs. 2) Understand the benefits and pitfalls of CDs and the transition to internet based sharing. 3) Understand the different internet (Cloud) based solutions that are available and what distinguishes them. 4) Learn that the cloud can be employed not only for archival but for a variety of radiology services. 5) Learn about the IHE XDS-I and related profiles and their role in internet based image exchange. 6) Understand what solutions a radiologist might implement at this time. 7) Understand how image exchange fits into the broader efforts directed at healthcare information exchange and interoperability through EHRs.

ABSTRACT

The safe and secure exchange of heatlhcare information is of paramount importance in delivering the highest quality of care to our patients. The realm of Health Information Exchange while nascent is undergoing explosive growth. The exchange of radiologic exams and reports must be tightly integrated into this process. Radiological images have historically presented some unique challenges. This session will focus on existing solutons for image exchange/interoperability and discuss how it is expected to evolve over the next few years through the use of internet based technologies.

RCC53C Vendor Neutral Archives vs Archive Neutral Vendors: Towards the Next Generation Archive

Participants

Richard L. Kennedy, MSc, Sacramento, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the differences between vendor neutral archives, archive neutral vendors, and cloud archives. 2) Identify key strategic advantages and disadvantages of these three respective models of archival. 3) Observe some potential obstacles to implementation of these three respective models of archival.

MSCA51

Case-based Review of the Abdomen (An Interactive Session)

Thursday, Dec. 3 1:30PM - 3:00PM Location: S406A

GI GU OB ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Douglas S. Katz, MD, Mineola, NY, (dkatz@winthrop.org) (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review a series of clinically relevant, abdominal imaging cases, with audience participation. 2) To review important concepts and potential pitfalls of: the liver on sonography; the acute abdomen on US, CT, and MR; liver transplants on multi-modality imaging; genitourinary imaging; and trauma imaging 3) To provide take home points for the audience based on specific actual case material which was instructional or problematic for the presenters.

ABSTRACT

Sub-Events

MSCA51A Hepatic Tumor Imaging

Participants
Puneet Bhargava, MD, Shoreline, WA (*Presenter*) Editor, Reed Elsevier

LEARNING OBJECTIVES

1) Review imaging appearances of common hepatic tumors. 2) Review key imaging findings that aid in differential diagnosis.

ABSTRACT

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Puneet Bhargava, MD - 2015 Honored Educator

MSCA51B Abdominal Trauma Imaging

Participants
Savvas Nicolaou, MD, Vancouver, BC (*Presenter*) Institutional research agreement, Siemens AG

LEARNING OBJECTIVES

1) Review the technique and protocols, with an emphasis on MDCT, for imaging of blunt and penetrating abdominal and pelvic trauma. 2) Demonstrate examples of the spectrum of injuries and the accompanying management associated with abdominal trauma, including hepatic and hepatobiliary (gallbladder) injuries, bowel and mesenteric injuries, and pelvic injuries including bladder and vascular injuries. 3) Demonstrate significance of arterial and portal venous phase imaging in the setting blunt abdominal and pelvic trauma, and the utility of whole body imaging. 4) Review new imaging applications and techniques such as iterative reconstruction and dual-energy CT, which can help better image abdominal and pelvic injuries post-trauma.

ABSTRACT

MSCA51C Acute Abdomen Imaging

Participants
Stephan W. Anderson, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will be exposed to the current literature related to imaging of acute abdominal pain using CT. 2) The participant will be able to apply an evidence-based approach to CT protocol development in the imaging of acute abdominal pain. 3) The participant will be able to independently evaluate the published literature in this area in a critical fashion and continue to apply recent developments to their own practice.

MSCB51

Case-based Review of Breast (An Interactive Session)

Thursday, Dec. 3 1:30PM - 3:00PM Location: S100AB

BR DM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Janie M. Lee, MD, Bellevue, WA (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the appropriate application of multimodality breast imaging for routine screening, supplemental screening, and diagnostic indications. 2) Select appropriate methods for performing imaging-guided percutaneous breast biopsy and post-biopsy radiologic-pathologic correlation. 3) Calculate performance measure values for a breast imaging audit and compare with appropriate benchmarks.

Sub-Events

MSCB51A Screening: Digital Mammography and Tomosynthesis

Participants
Helen Anne D'Alessandro, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the current role of screening digital mammography and tomosynthesis. 2) To demonstrate digital mammography and tomosynthesis use for evaluating screening callbacks of masses, calcifications, architectural distortion and summation artifacts. 3) To discuss tomosynthesis for decreasing callback rates, evaluating extent of disease and increasing cancer detection rates.

ABSTRACT

This case based review will demonstrate digital mammography and tomosynthesis use for evaluating callbacks of masses, calcifications, architectural distortion and summation artifacts. Practical considerations of digital mammography and tomosynthesis will also be discussed, including the effect of digital tomosynthesis on screening callback rates, evaluating extent of disease and increasing cancer detection rates.

MSCB51B Supplemental Screening in an Era of Breast Density Notification Legislation

Participants
Janice S. Sung, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

This talk will focus on the various imaging modalities that are available for supplemental screening for intermediate and high risk patients, including ultrasound, MRI, and contrast enhanced digital mammography. The clinical evidence supporting their use for supplemental screening will be reviewed. The advantages and disadvantages of each modality will also be reviewed during this case based session.

MSCB51C Evaluating the Symptomatic Patient

Participants
Catherine M. Appleton, MD, Saint Louis, MO (*Presenter*) Scientific Advisory Board, Hologic, Inc; Royalties, Oxford University Press;

LEARNING OBJECTIVES

1) To understand the clinical presentation of benign and malignant breast conditions. 2) To review current guidelines for evaluating the symptomatic patient. 3) To discuss specific imaging approaches for evaluating breast symptoms.

SPRG51

RadioGraphics' Publication Information for Potential Authors

Thursday, Dec. 3 1:30PM - 2:45PM Location: E350

OT

AMA PRA Category 1 Credits ™: 1.25
ARRT Category A+ Credits: 1.50

Participants
Jeffrey S. Klein, MD, Burlington, VT, (jklein@rsna.org) (*Presenter*) Nothing to Disclose
Kimberly L. Franks, Oak Brook, IL (*Presenter*) Nothing to Disclose
Lucinda Foulke, Oak Brook, IL (*Presenter*) Nothing to Disclose
Stephanie Khio, Oak Brook, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Prepare a format- and content-compliant manuscript for possible publication. 2) Use ScholarOne Manuscripts to submit a manuscript for possible publication. 3) Become familiar with the RadioGraphics publication process.

ABSTRACT

The majority of material published in RadioGraphics is derived from solicited education exhibits selected by subspecialty panels at the RSNA annual meeting. This session, conducted by the RadioGraphics peer review and production staff, will review the process of developing a manuscript from your solicited exhibit and submitting your material via our online submission and peer review system ScholarOne. The components of a standard RadioGraphics manuscript will be detailed, including the creation of a CME test. There will be ample time for questions to the staff and the editor of RadioGraphics, Dr. Jeffrey Klein.

URL

Active Handout:Lucinda Foulke

http://abstract.rsna.org/uploads/2015/15001733/SPRG51.pdf

VSIO51

Interventional Oncology Series: Management of Hepatic Metastases from Colorectal Cancer and Neuroendocrine Tumors

Thursday, Dec. 3 1:30PM - 6:00PM Location: S405AB

GI IR RO

AMA PRA Category 1 Credits ™: 4.25
ARRT Category A+ Credits: 5.00

FDA Discussions may include off-label uses.

Participants
Sarah B. White, MD,MS, Philadelphia, PA, (sbwhite@mcw.edu) (*Moderator*) Nothing to Disclose

ABSTRACT

Sub-Events

VSIO51-01 Setting the Stage: NCCN/ESMO Guidelines for mCRC

Thursday, Dec. 3 1:30PM - 1:45PM Location: S405AB

Participants
Mary F. Mulcahy, MD, Chicago, IL (*Presenter*) Nothing to Disclose

VSIO51-02 Advances in the Surgical Toolbox for Colorectal Liver Metastases

Thursday, Dec. 3 1:45PM - 2:00PM Location: S405AB

Participants
Kiran Turaga, Milwaukee, WI (*Presenter*) Speakers Bureau, Caris Life Sciences; Consultant, Johnson & Johnson

LEARNING OBJECTIVES

1) To identify the role and timing of surgical resection of metastatic colorectal cancer in improving survival of patients. 2) To identify potential pitfalls and risks in implementing surgical resection with regional therapies to the liver. 3) To understand the evolving role of hepatic arterial infusional therapy in the management of patients with unresectable CRLM.

VSIO51-03 Colorectal Liver Metastases: To Ablate or not to Ablate?

Thursday, Dec. 3 2:00PM - 2:15PM Location: S405AB

Participants
David A. Woodrum, MD, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the role of ablation for colorectal metastases. 2) To identify which patients may be the best candidates for ablation. 3) To review the advantages/disadvantages of the liver ablation technologies.

ABSTRACT

Colorectal cancer is ranked fourth in cancer occurrence and second in cancer death in the West. Somewhere between 50-70% of these patients will develop liver metastases throughout their course. Locoregional thermal ablative therapies are important treatment options for liver metastases, achieving good short-term outcomes with low morbidity. This review summarizes the current evidence for the using liver ablation techniques with colorectal metastases and summarizes which patient population may benefit the most.

VSIO51-04 K-ras Mutation is Associated with a Shorter Overall Survival after RF Ablation of Colorectal Liver Metastases

Thursday, Dec. 3 2:15PM - 2:25PM Location: S405AB

Participants
Waleed Shady, MBBCh, New York, NY (*Presenter*) Nothing to Disclose
Vlasios S. Sotirchos, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Elena N. Petre, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Etay Ziv, MD,PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Jeremy C. Durack, MD, New York, NY (*Abstract Co-Author*) Scientific Advisory Board, Adient Medical Inc Investor, Adient Medical Inc
Constantinos T. Sofocleous, MD, PhD, New York, NY (*Abstract Co-Author*) Consultant, Sirtex Medical Ltd
Stephen B. Solomon, MD, New York, NY (*Abstract Co-Author*) Research Grant, General Electric Company
Efsevia Vakiani, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Mithat Gonen, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Rona D. Yaeger, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Nancy Kemeny, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To describe the incidence and patterns of genetic marker mutations, and to evaluate their potential prognostic value on local tumor progression (LTP)-free and overall survival (OS) after RFA of colorectal cancer liver metastases (CLM).

METHOD AND MATERIALS

We performed an IRB approved retrospective review of a HIPPA compliant clinical ablation database for patients with CLM treated with RFA between December 2002 and December 2012. Only patients with available genetic testing profiles were included. Genetic profiles were obtained by mass-spectrometry based sequenom assay of surgical/biopsy specimens obtained from primary/metastatic sites. Genes analyzed for mutations included: (1) K-ras, (2) K-ras and BRAF, or (3) an 8 gene panel (K-ras, N-ras, BRAF, PIK3CA, Akt1, MEK1, ERBB2, and EGFR). Kaplan-Meier methodology was used to calculate LTP-free and OS rates. The log-rank test was used to evaluate the prognostic value of genetic marker mutations.

RESULTS

This study enrolled 90 patients with 139 CLM. Median tumor size was 1.7 cm (range: 0.6-5 cm). The median follow-up was 52 months. Results for the mutation status were available for k-ras in all patients, for BRAF in 58 patients, and for the 8 genes in 23 patients. K-ras was mutated in 40% of patients (36/90), BRAF in 7% (4/58), PIK3CA in 17% (4/23), N-ras in 9% (2/23), and no mutations were observed for the other genes. There was a trend towards shorter median OS in patients with mutated genes; K-ras (29 months versus 46 months), BRAF (22 months versus 53 months), PIK3CA (22 months versus 51 months), N-ras (8 months versus 51 months). Statistical significance was only reached for K-ras (P=0.037) and N-ras (P<0.001), but not for BRAF (P=0.18) and PIK3CA (P=0.8). There was no difference in the LTP-rates with mutations of K-ras 46% (22/48) versus 42% (38/90) (P=0.26), BRAF 33% (2/6) versus 39% (43/88) (P=0.69), PIK3CA 0% (0/5) versus 39% (15/38) (P=0.16), or N-ras 50% (1/2) versus 34% 14/41 (P=0.17). There was a trend towards shorter LTP-free survival with K-ras mutations; median of 26 months versus 37 months.

CONCLUSION

Mutations of K-ras and N-ras are associated with a shorter overall survival after RFA of CLM. Mutations of K-ras are associated with a shorter LTP-free survival, although LTP rate was not statistically different.

CLINICAL RELEVANCE/APPLICATION

K-ras mutant patients require more strict follow-up and could benefit from adjuvant chemotherapy after RFA of CLM.

VSIO51-05 Palliative Embolotherapy: New Technology, New Promises?

Thursday, Dec. 3 2:25PM - 2:40PM Location: S405AB

Participants
Tobias F. Jakobs, MD, Munich, Germany, (tobias.jakobs@barmherzige-muenchen.de) (*Presenter*) Speaker, Sirtex Medical Ltd; Research Consultant, Sirtex Medical Ltd; Speaker, Siemens AG; Speaker, Terumo Corporation; Speaker, Surefire Medical, Inc; Speaker, BTG International Ltd

LEARNING OBJECTIVES

1) Indications for palliative embolotherapy.2) Results of palliative embolization in mCRC patients.3) Products and devices for embolotherapy.

ABSTRACT

Embolisation has become an accepted modality of cancer treatment in patients with a variety of clinical scenarios. It is commonly used in clinical practice in the treatment of hepatocellular carcinoma, hepatic metastases from colorectal and breast cancer and neuroendocrine tumors. This review summarizes the current evidence for the efficacy of embolotherapy in mCRC patients, together with the associated complications and future options.

VSIO51-06 A Gene Signature to Predict Tumor Response to Hepatic Arterial Embolization

Thursday, Dec. 3 2:40PM - 2:50PM Location: S405AB

Participants
Etay Ziv, MD,PhD, New York, NY (*Presenter*) Nothing to Disclose
Elena N. Petre, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Stephen B. Solomon, MD, New York, NY (*Abstract Co-Author*) Research Grant, General Electric Company
Franz E. Boas, MD,PhD, New York, NY (*Abstract Co-Author*) Co-founder, ClariPACS
Karen T. Brown, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Joseph P. Erinjeri, MD, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To identify a gene mutation signature that may potentially be used to predict tumor response to hepatic arterial embolization.

METHOD AND MATERIALS

We performed a retrospective review to identify patients who have undergone bland hepatic arterial embolization for the treatment of primary liver cancer or liver metastases that also had available a panel of genetic testing results--specifically, an assay that identifies mutations in any of 341 'druggable' genes by sequencing tumor samples and comparing with germline mutations. A total of 10 patients were identified whose biopsy specimens were recovered either prior to or after embolization of the liver tumors. Of the ten patients identified, 4 had hepatocellular carcinoma (HCC), and the other 6 had non-HCC tumors included pancreatic neuroendocrine tumor (2), melanoma (1), thyroid (1), kidney carcinoid (1), and acinar cell tumor (1). We used principal component analysis for dimensionality reduction and to identify the genes which most contributed to the variance in the data. Patients were categorized using RECIST criteria as either responders (partial response or complete response) or non-responders (progressive disease or stable disease) post-embolization.

RESULTS

Of the ten patients identified, half demonstrated either complete response or partial response post-embolization (two of these were HCC patients). The rest were categorized as non-responders. A principal component analysis demonstrates that much of the variance in the data can be summarized by the two groups (responders and non-responders), and that the second principal component may predict tumor response to embolization (see Figure 1). The top genes contributing to this principal component are involved in cross-talk between the Wnt/B-catenin signaling pathway and hypoxia signaling pathway (see Table 1).

CONCLUSION

A gene mutation signature suggests that tumor response to embolization may be predicted by the underlying mutation profile of the tumor and moreover, suggests a central role for the involvement of hypoxia and Wnt/B-catenin signaling pathways.

CLINICAL RELEVANCE/APPLICATION

A gene signature that can predict tumor response to embolization may be used to better stratify patients as well as potentially broaden the scope of embolization to liver metastases not traditionally treated by this procedure.

VSIO51-07 Delayed-arterial Phase Cone-Beam CT Improves the Visibility of Liver Metastasis during Intra-arterial Therapy

Thursday, Dec. 3 2:50PM - 3:00PM Location: S405AB

Participants
Ruediger E. Schernthaner, MD, Vienna, Austria (*Presenter*) Nothing to Disclose
Reham R. Haroun, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose
Rafael Duran, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Howard Lee, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Sonia P. Sahu, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Jae Ho Sohn, MD,MS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Julius Chapiro, MD, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Yan Zhao, MS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Boris Gorodetski, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Florian N. Fleckenstein, MS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Susanne Smolka, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Alessandro G. Radaelli, PHD, MS, Best, Netherlands (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Martijn Van Der Bom, MSC, Andover, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation

PURPOSE

Improved visibility of liver metastasis during intra-arterial therapy (IAT) could improve tumor targeting. The purpose of this study was to compare the visibility of liver metastasis on dual-phase cone-beam CT (DP-CBCT) and digital subtraction angiography (DSA), with reference to pre-interventional contrast-enhanced magnetic resonance imaging (CE-MRI) of the liver.

METHOD AND MATERIALS

Of 416 patients with liver metastasis treated with IAT between January 2010 and October 2014 at our institution, 15, 10 and 3 patients with neuroendocrine, colorectal and sarcoma liver metastasis (NELM, CRCLM and SLM), respectively, had intra-procedural DP-CBCT and were included in this retrospective study. DP-CBCT was acquired after a single injection of contrast agent in the tumor-feeding arteries at an early and delayed arterial phases (EAP and DAP). The visibility of each lesion was graded by two radiologists in consensus on a three rank scale (complete, partial and none) on DP-CBCT and DSA images when compared to CE-MRI. McNemar's test was used.

RESULTS

47 NELM, 45 CRCLM and 16 SLM lesions were included. On DSA, 59.6%, 15.6% and 18.8% of NELM, CRCLM and SLM lesions were completely depicted, respectively. Complete depiction rate on EAP-CBCT was significantly higher for CRCLM (44.4%; $p<0.001$), but significantly lower for NELM (40.4%; $p=0.049$) and similar for SLM (25%, $p=1.0$). On DAP-CBCT however, the highest rates of complete depiction were found - NELM (97.1%), CRCLM (91.1%) and SLM (100%), all $p<0.001$.Complete or partial depiction was achieved on DSA for 85.1%, 42.2% and 37.5% of NELM, CRCLM and SLM, respectively. EAP-CBCT yielded significantly higher sensitivities of 84.4% and 87.5% for CRCLM and SLM, respectively ($p<0.02$), but not for NELM (89.4%; $p=0.625$). DAP-CBCT again demonstrated the highest sensitivity at 100%, 95.6% and 100% for NELM, CRCLM and SLM, respectively ($p<0.002$). In summary, out of 108 metastatic liver lesions, 106 (98.1%) were at least partially depicted and only 2 (1.9%) CRCLM could not be identified on DAP-CBCT. In contrast, 43 (39.8%) lesions could not be identified on DSA.

CONCLUSION

DAP-CBCT significantly improves the visibility of liver metastasis during IAT and should be used as standard intra-procedural imaging technique.

CLINICAL RELEVANCE/APPLICATION

Improved visibility of metastatic liver lesions facilitates a more selective treatment to reduce non-target embolization without missing some lesions occult on DSA.

VSIO51-08 mCRC Tumor Board

Thursday, Dec. 3 3:00PM - 3:30PM Location: S405AB

Participants
Michael C. Soulen, MD, Philadelphia, PA (*Presenter*) Royalties, Cambridge University Press; Consultant, Guerbet SA; Research support, Guerbet SA; Consultant, BTG International Ltd; Research support, BTG International Ltd; Consultant, Merit Medical Systems, Inc; Speaker, Sirtex Medical Ltd
Sarah B. White, MD,MS, Philadelphia, PA, (sbwhite@mcw.edu) (*Presenter*) Nothing to Disclose
Mary F. Mulcahy, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Kiran Turaga, Milwaukee, WI (*Presenter*) Speakers Bureau, Caris Life Sciences; Consultant, Johnson & Johnson
David A. Woodrum, MD, PhD, Rochester, MN (*Presenter*) Nothing to Disclose
Tobias F. Jakobs, MD, Munich, Germany, (tobias.jakobs@barmherzige-muenchen.de) (*Presenter*) Speaker, Sirtex Medical Ltd;

Research Consultant, Sirtex Medical Ltd; Speaker, Siemens AG; Speaker, Terumo Corporation; Speaker, Surefire Medical, Inc; Speaker, BTG International Ltd

LEARNING OBJECTIVES

ABSTRACT

VSIO51-09 Setting the Stage mNET

Thursday, Dec. 3 3:40PM - 3:55PM Location: S405AB

Participants
Emily Bergsland, MD, San Francisco, CA (*Presenter*) Research funding, Novartis AG Research support, F. Hoffmann-La Roche Ltd Consultant, Pfizer Inc Consultant, Lexicon Pharmaceuticals, Inc Consultant, Novartis AG

LEARNING OBJECTIVES

1) Review the epidemiology and classification of gastroenteropancreatic neuroendocrine tumors (GEPNETS). 2) Discuss the role of somatostatin analogs for the treatment of GEPNETS. 3) Summarize the current systemic treatment options for metastatic GEPNETs. 4) Examine commonly applied treatment algorithms for advanced GEPNETS.

ABSTRACT

VSIO51-10 Aggressive Surgical Management in mNET

Thursday, Dec. 3 3:55PM - 4:10PM Location: S405AB

Participants
Robert E. Roses, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the role of liver resection or ablation in the multidisciplinary management of neuroendocrine tumors.

ABSTRACT

The management of neuroendocrine tumors has evolved considerably in recent years with the introduction of new systemic and local therapies. Surgery remains an important component of therapy. Indications for surgery for primary tumors and metastases as well nuances of therapy sequencing and multidisciplinary decision making will be discussed.

VSIO51-11 Imaging Biomarkers of Tumor Response in Neuroendocrine Liver Metastases Treated with Intraarterial Therapy: Can Whole Liver Response Patterns Predict Patient Survival?

Thursday, Dec. 3 4:10PM - 4:20PM Location: S405AB

Participants
Sonia P. Sahu, New Haven, CT (*Presenter*) Nothing to Disclose
Ruediger E. Schernthaner, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Roberto Ardon, Suresnes Cedex, France (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Julius Chapiro, MD, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Jae Ho Sohn, MS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Yan Zhao, MS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Florian N. Fleckenstein, MS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ming De Lin, PhD, Cambridge, MA (*Abstract Co-Author*) Employee, Koninklijke Philips NV
Jean-Francois H. Geschwind, MD, Westport, CT (*Abstract Co-Author*) Researcher, BTG International Ltd; Consultant, BTG International Ltd; Researcher, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Researcher, Guerbet SA; Consultant, Guerbet SA; Consultant, Terumo Corporation; Consultant, Threshold Pharmaceuticals, Inc; Consultant, PreScience Labs, LLC; Researcher, Boston Scientific Corporation; Consultant, Boston Scientific Corporation
Rafael Duran, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Neuroendocrine liver metastases (NELM) usually appear diffuse and bi-lobar. However, conventional therapy response assessments (WHO, RECIST, mRECIST, and EASL) are lesion-based and thus challenging to implement in NELM patients. We propose a new approach that uses 3D liver segmentation to assess the total enhancing tumor volume (ETV). The purpose of this study was to investigate whether changes in ETV on contrast-enhanced T1 weighted MRI could be an early biomarker for survival after the first transarterial chemoembolization (TACE).

METHOD AND MATERIALS

This retrospective study included 51 patients (men: 28; median age: 58.3 years) with diffuse bi-lobar NELM who underwent MRI 3-6 weeks before and after the first TACE. Using prototype semi-automatic 3D software, two independent readers segmented the whole liver, placed a 1 cm3 region of interest (ROI) in healthy liver parenchyma, and measured the ETV in the arterial phase. Enhancement was defined as >2 standard deviations the average intensity of the ROI. Intraclass correlation (ICC) assessed inter-reader agreement. Paired t-test compared the ETV before and after TACE. If ETV decreased by ≥ 50%, patients were classified as responders. Survival analysis included Kaplan-Meier curves with the log-rank test and Cox-proportional hazards modeling. Baseline characteristics that were statistically significant on univariate analysis were adjusted for in the multivariate model.

RESULTS

Mean ETV decreased significantly after TACE from 1432.6 to 826.6 cm3 ($p < 0.01$) and 20 (39.2%) patients were classified as responders. Responders had a significantly better prognosis than non-responders, with a median overall survival of 84.3 vs. 16.7 months, respectively ($p<0.01$). In univariate analysis, response was a significant predictor of survival (HR: 0.15, 95% CI: 0.06-0.39) and in the multivariate model adjusted for ECOG ≥1, portal vein thrombosis and extrahepatic disease, response was the only significant covariate (HR: 0.21, 95% CI: 0.08-0.60). Inter-reader agreement was high before and after TACE (ICC 0.999, 95% CI: 0.998-0.999 and ICC 0.998, 95% CI: 0.997-0.999, respectively).

CONCLUSION

Changes in the total enhancing tumor volume can identify NELM patients who will experience prolonged survival as early as 1 month after TACE

CLINICAL RELEVANCE/APPLICATION

Total enhancing tumor volume in 3D is recommended as an early imaging biomarker for survival in NELM patients treated with TACE.

VSIO51-12 Intra-arterial Therapies of GEP-NET: Techniques and Indications

Thursday, Dec. 3 4:20PM - 4:35PM Location: S405AB

Participants
Thierry J. De Baere, MD, Villejuif, France (*Presenter*) Consultant, Terumo Corporation; Speaker, Medtronic, Inc; Consultant, General Electric Company; Consultant, Guerbet SA;

LEARNING OBJECTIVES

1) To understand particular natural history of NET métastases and indication for local thérapies. 2) To Know intra-arterial thérapies available for NET inclusion bland embolization, TACE and radioemebolization. 3) To know published results on efficace of intra-arterial thérapies on NET livre métastases. 4) To know about possible complications of intra-arterial thérapies on NET livre métastases.

ABSTRACT

gastro-entero pancreatic-neuroendocrine tumors (GEP-NET) from small intestine and pancreas are most common cause of NET liver metastases. Grade 1 (carcinoid / < 2 mitoses / 10 microscopic fields and Ki-67 < 2%) and grade 2 (well- differentiated / 2 to 20 mitoses and Ki-67 from 3 to 20%) (1) are potential candidate for liver directed therapies where G3 carcinoma are candidate for systemic treatment (2). For secretary syndrome, liver directed therapies are second line treatment after somatostatin analogs. For control of tumor growth, liver directed therapies are used upon progression or for large tumor burden. Intra-arterial therapies combine occlusion of the tumor feeders, with or without chemotherapy or radiation therapy including trans-arterial chemoembolization (TACE), trans-arterial embolization (TAE), and radioembolization (RE). GEP NET liver metastases are usually bilobar and two sessions of treatment will be delivered sequentially 4-8 weeks apart to each lobes. If the tumors are in small number, hyper-selective will be delivered. Patients with >75% of liver involvement must be treated a few segments of liver at once, and will require several sessions.Contraindications includes liver insufficiency, obstructive jaundice, bilioenteric anastomoses, portal vein thrombosis and renal insufficiency (3). In bilioenteric anastomoses or portal vein thrombosis RE could be an interesting alternative in early reports (4). TACE using Lipiodol used for more than 20 years provides 52-86 % response on the secretory syndrome for over 12 months (5, 6). OS has a median of 38.6 months (33-55 months for non-pancreatic-NET and 23-43 months for pancreatic-NET) (7-9). Our recent unpublished data highlight a median OS of 7 year in 103 patients treated with TACE for G1 and G2 GEP NET. A review of 148 patients treated with 185 radio-embolization procedures (CR:2.7%, PR:60.5%, SD:22.7%, PD:4.9%) reported a Median OS of 70 months, with no radiation-induced liver disease (10). Grade 3 or higher adverse events were fatigue (6.5%), nausea (3.2%), pain (2.7%), and ascites (0.5%).

VSIO51-13 Y-90-4mNET

Thursday, Dec. 3 4:35PM - 4:50PM Location: S405AB

Participants
Steven C. Rose, MD, San Diego, CA (*Presenter*) Stockholder, Sirtex Medical Ltd; Proctor, Sirtex Medical Ltd; Scientific Advisory Board, Surefire Medical, Inc; Consultant, Surefire Medical, Inc; Stockholder, Surefire Medical, Inc; Consultant, Embolx, Inc

VSIO51-14 SW43-DOX Loaded DEB-TACE, a Potential New Drug Delivery Platform - An in Vitro Evaluation

Thursday, Dec. 3 4:50PM - 5:00PM Location: S405AB

Participants
Johannes M. Ludwig, Pittsburgh, PA (*Presenter*) Nothing to Disclose
Yongkang Gai, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Sun Lingyi, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Dexing Zeng, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Hyun S. Kim, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose

RESULTS

Fluorescence Microscopy showed specific binding of SW43-DOX-Cy3 in Panc-1, HT-29 & HEPG2 cells. Panc-1 cells showed a specific uptake of SW43-DOX-Lu177 at .5h (0.83 nmol/mg prot.), which increased to 1.36 and 1.21 nmol/mg prot. at .5h and 3h ($p<.01$) respectively. Compared to DOX, SW43-DOX demonstrated significantly superior viability reduction (at least $p<.01$ for all comparison) of PANC-1 of cells treated with DOX or SW43-DOX: 98.7% vs. 64% (25µM) and 88.3% vs. 33.3% (50µM) after 6h; 46.6% vs. 30.6% (25µM) and 39.5% vs. 5.3% (50µM) after 24 h and 15% vs. 2.9% (25µM) and 9.5% vs. 0.54% (50µM) after 48 h. Results from HEPG2, besides 25 µM (6h) & 50 µM (48h), and HT-29 cells also proved statistical superiority of SW43-DOX over DOX ($p<.01$). Loading on DEB was 95% within 24h.

CLINICAL RELEVANCE/APPLICATION

Preclinical Evaluation.

VSIO51-15 Theranostic Approaches to the Management of Neuroendocrine Tumors

Thursday, Dec. 3 5:00PM - 5:15PM Location: S405AB

Participants
Chaitanya Divgi, MD, New York, NY (*Presenter*) Nothing to Disclose

VSIO51-16 Intra-arterial Therapy in Liver Metastases: The 5 Best Papers of the Past Year?

Thursday, Dec. 3 5:15PM - 5:30PM Location: S405AB

Participants
Ricardo D. Garcia-Monaco, MD, PhD, Buenos Aires, Argentina (*Presenter*) Consultant, CeloNova BioSciences, Inc ; Consultant, BTG International Ltd; Speaker, Siemens AG

LEARNING OBJECTIVES

1) To comprehend 5 interesting papers of the last year on intrarterial therapies of liver metastasis. 2) To update the evidence on mCRC intrarterial therapies. 3) To discuss the best labatory research paper on the topic. 4) To discuss the largest published series on Y90 radioembolization outcome n mCRC. 5) To update the intrartherial therapies in mNET.

VSIO51-17 mNET Tumor Board

Thursday, Dec. 3 5:30PM - 6:00PM Location: S405AB

Participants
Michael C. Soulen, MD, Philadelphia, PA (*Presenter*) Royalties, Cambridge University Press; Consultant, Guerbet SA; Research support, Guerbet SA; Consultant, BTG International Ltd; Research support, BTG International Ltd; Consultant, Merit Medical Systems, Inc; Speaker, Sirtex Medical Ltd
Sarah B. White, MD,MS, Philadelphia, PA, (sbwhite@mcw.edu) (*Presenter*) Nothing to Disclose
Emily Bergsland, MD, San Francisco, CA (*Presenter*) Research funding, Novartis AG Research support, F. Hoffmann-La Roche Ltd Consultant, Pfizer Inc Consultant, Lexicon Pharmaceuticals, Inc Consultant, Novartis AG
Robert E. Roses, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Thierry J. De Baere, MD, Villejuif, France (*Presenter*) Consultant, Terumo Corporation; Speaker, Medtronic, Inc; Consultant, General Electric Company; Consultant, Guerbet SA;
Chaitanya Divgi, MD, New York, NY (*Presenter*) Nothing to Disclose
Ricardo D. Garcia-Monaco, MD, PhD, Buenos Aires, Argentina (*Presenter*) Consultant, CeloNova BioSciences, Inc ; Consultant, BTG International Ltd; Speaker, Siemens AG

RCC54

The Use of Business Analytics for Improving Radiology Operations, Quality, and Clinical Performance (In Association with the Society for Imaging Informatics in Medicine)

Thursday, Dec. 3 2:30PM - 4:00PM Location: S501ABC

IN LM SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Katherine P. Andriole, PhD, Dedham, MA (*Moderator*) Advisory Board, McKinsey & Company, Inc;

LEARNING OBJECTIVES

1) Understand what is meant by business analytics in the context of a radiology practice. 2) Be able to describe the basic steps involved in implementing a business analytics tool. 3) Learn how business analytics tools can be used for quality assurance in radiology, for maintenance of certification (MOC), and for practice quality improvement. 4) Be introduced to the capabilities of current and potential future business analytics technologies.

ABSTRACT

This course will provide an overview of the use of business analytics (BA) in radiology. How a practice manages information is becoming a differentiator in the competitive radiology market. Leveraging informatics tools such as business analytics can help a practice transform its service delivery to improve performance, productivity and quality. An introduction to the basic steps involved in implementing business analytics will be given, followed by example uses of BA tools for quality assurance, maintenance of certification (MOC) and pracitce quality improvement . The power of current business analytics technologies will be described, along with a look at potential future capabilities of business analytics tools.

Sub-Events

RCC54A Introduction to Business Analytics Demonstrating Application to Radiology

Participants
Katherine P. Andriole, PhD, Dedham, MA (*Presenter*) Advisory Board, McKinsey & Company, Inc;

LEARNING OBJECTIVES

1) Gain an overview of business analytics tools and understand how they might be used in radiology. 2) Be able to describe the general steps involved in business analytics, including extract, transform, load (ETL) and key performance indicators (KPI). 3) See a demonstration implementation of an open-source business analytics tool using a radiology use case.

ABSTRACT

This session will provide a general overview of business analytics concepts and how they can be used in radiology. A walk through of the basic steps involved in implementation including identifying, collecting, transforming, and dynamically presenting key performance indicators (KPI) will be demonstrated. The extract, transform, load (ETL) steps will be shown using an example use case, and multiple database sources taken from a radiology practice.

RCC54B Operational and Predictive Analytics in Radiology

Participants
Paul G. Nagy, PhD, Baltimore, MD, (pnagy@jhu.edu) (*Presenter*) Institutional license agreement, Analytical Informatics, Inc

LEARNING OBJECTIVES

1) Explain the big data science and radiology. 2) Identify the role of informatics in capturing, extracting, analyzing, and communication quality projects. 3) Illustrate graphical dashboarding examples to support quality efforts.

ABSTRACT

Honored Educators

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Paul G. Nagy, PhD - 2014 Honored Educator

RCC54C Capabilities of Current and Future Business Analytics Technologies

Participants
Mindy Licurse, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To gain familiarity with currently available business technologies and their relevance to radiology practice. 2) To consider how existing business technologies can support quality assurance in radiology. 3) To learn about business analytics features that may be available/desirable in the future to augment and support both the practice of radiology.

ABSTRACT

SPDL51

RSNA Diagnosis Live™: Peds, IR, Potpourri

Thursday, Dec. 3 3:00PM - 4:00PM Location: E451B

IR PD

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Paul J. Chang, MD, Chicago, IL, (pchang@radiology.bsd.uchicago.edu) (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Medical Advisory Board, lifeIMAGE Inc; Medical Advisory Board, Merge Healthcare Incorporated
Brian S. Funaki, MD, Riverside, IL (*Presenter*) Data Safety Monitoring Board, Novate Medical
Kate A. Feinstein, MD, Chicago, IL, (kfeinstein@radiology.bsd.uchicago.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The participant will be introduced to a series of radiology case studies via an interactive team game approach designed to encourage "active" consumption of educational content. 2) The participant will be able to use their mobile wireless device (tablet, phone, laptop) to electronically respond to various imaging case challenges; participants will be able to monitor their individual and team performance in real time. 3) The attendee will receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance. This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

SPSH51

Hot Topic Session: Musculoskeletal Applications of Dual Energy CT

Thursday, Dec. 3 3:00PM - 4:00PM Location: E353C

MK CT

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Kenneth S. Lee, MD, Madison, WI (*Moderator*) Research Consultant, SuperSonic Imagine; Consultant, Echometrix, LLC; Royalties, Reed Elsevier
Mary G. Hochman, MD, West Roxbury, MA (*Moderator*) Stockholder, General Electric Company; Stock options, Nomir Medical Technologies, Inc; Author, UpToDate, Inc

Sub-Events

SPSH51A MSK Applications of Dual Energy CT: Gout

Participants
Jeffrey J. Peterson, MD, Neptune Beach, FL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the basic theory and technique of dual energy CT for detection and localization of uric acid. 2) Highlight the current role for DECT in the current clinical algorithm for the diagnosis of gout. 3) Identify the value of DECT 3D tophus quantification in the management of gout.

ABSTRACT

URL

Honored Educators

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Jeffrey J. Peterson, MD - 2012 Honored Educator

SPSH51B MSK Applications of Dual Energy CT: Metal Artifact Reduction, Bone Marrow Edema and Tendon/Ligament Analysis

Participants
Savvas Nicolaou, MD, Vancouver, BC (*Presenter*) Institutional research agreement, Siemens AG

LEARNING OBJECTIVES

1) Briefly review the basic physics principles of DECT/Spectral imaging. 2) Explain the clinical utility of DECT in MSK Applications, with a focus on metal artifact reduction, bone marrow edema and tendon/ligament analysis.

SPSH52

Hot Topic Session: Molecular Neuroimaging in Dementia: State-of-the-Art and Emerging Techniques

Thursday, Dec. 3 3:00PM - 4:00PM Location: E350

NR BQ MI MR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants
Satoshi Minoshima, MD, PhD, Salt Lake City, UT (*Moderator*) Royalties, General Electric Company; Consultant, Hamamatsu Photonics KK; Research Grant, Hitachi, Ltd; Research Grant, Nihon Medi-Physics Co, Ltd; Research Grant, Astellas Group; Research Grant, Seattle Genetics, Inc;
Alexander Drzezga, MD, Cologne, Germany (*Moderator*) Research Grant, Eli Lilly and Company; Speakers Bureau, Siemens AG; Speakers Bureau, General Electric Company; Speakers Bureau, Piramal Enterprises Limited; Research Consultant, Eli Lilly and Company; Research Consultant, Piramal Enterprises Limited; ; ; ; ; ;

Sub-Events

SPSH52A Potential of Amyloid Imaging versus MRI in the Diagnostic Workup of Dementia

Participants
Clifford R. Jack JR, MD, Rochester, MN (*Presenter*) Stockholder, Johnson & Johnson; Research Consultant, Eli Lilly and Company; ;

LEARNING OBJECTIVES

1) Explain the utility of structural MRI and amyloid PET in characterizing the pattern of neurodegeneration and pathologic involvement in dementia syndromes. 2) Identify the advanced MRI techniques that provide information on disease pathophysiology in dementia. 3) Discuss cases for which MRI and amyloid PET would provide critical information for clinical assessment.

ABSTRACT

Development of molecular imaging agents for fibrillar β-amyloid (Aβ) positron emission tomography (PET), brought molecular imaging of Alzheimer's disease (AD) pathology into the spotlight. Large cohort studies with longitudinal follow-up in cognitively normal, mild cognitive impairment and AD patients indicate that Aβ deposition can be detected many years, even decades before the onset of symptoms with molecular imaging and its progression can be followed longitudinally. The role of molecular imaging in AD clinical trials is growing rapidly especially in an era when preventive interventions are designed towards eradicating the pathology targeted by molecular imaging agents. The utility of Aβ PET in differential diagnosis of AD is greatest when there is no pathologic overlap between the two dementia syndromes such as in frontotemporal lobar degeneration and AD. However Aβ PET alone may be insufficient in distinguishing dementia syndromes that commonly have overlapping Aβ pathology, such as dementia with Lewy bodies and vascular dementia, which represent the two most common dementia pathologies after AD. MRI is recommended during the initial evaluation of dementia, in order to determine potentially treatable causes such as tumors, subdural hematoma or normal pressure hydrocephalus. In addition, presence and extent of cerebrovascular disease, which may contribute to cognitive impairment and dementia, can be determined during this initial MRI evaluation. Pattern of structural MRI changes reflect neurodegenerative pathology and are closely associated with the clinical disease severity in AD. Although Aβ deposition is the most common pathologic process observed in dementia patients, other pathologic processes such as loss of neuronal integrity and connectivity can be measured with the advanced MRI techniques and complement Aβ PET.

URL

SPSH52B Imaging Inflammation and Molecular Pathology in Dementia

Participants
Ana M. Catafau, MD, PhD, Barcelona, Spain, (ana.catafau@piramal.com) (*Presenter*) Employee, Piramal Imaging GmbH

LEARNING OBJECTIVES

1) Explain potential clinical applications of different molecular pathology PET tracers. 2) List different targets for neuroinflammation PET imaging. 3) Describe advantages and disadvantages of different PET targets for neuroinflammation imaging. 4) Identify challenges for the development of molecular pathology tracers for neurodegenerative disorders.

ABSTRACT

Clinical classifications of neurodegenerative disorders are often based on neuropathology. The term „proteinopathies" includes disorders that have in common abnormal proteins as a hallmark, e.g. amyloidoses, tauopathies, synucleopathies, ubiquitinopathies. Different proteins can also co-exist in the same disease. To further complicate the pathophysiology scenario, not only different proteins, but also cells are believed to play an active role in neurodegeneration, in particular those participating in neuroinflammatory processes in the brain, such as activated microglia and astrocytes. In clinical practice, differentiating pathophysiology from clinical symptoms to allow accurate clinical classification of these disorders during life, becomes difficult in absence of biomarkers for these pathology hallmarks. PET imaging can be a useful tool in this context. Using PET tracers targeting misfolded proteins it will be possible to identify the presence or absence of the target, to depict the cerebral distribution and to quantify the protein load in different cerebral regions, as well as to monitor changes over time. Beta-amyloid is one of the proteins involved in neurodegenerative disorders, which is currently suitable to be imaged by means of PET. Research efforts are currently ongoing in order to identify new PET tracers targeting non-amyloid PET tracers for neurodegeneration. This presentation will focus on the investigational PET tracers targeting tau and alpha-synuclein as misfolded proteins, and activated microglia and astrocytes as cellular targets for neuroinflammation.

URL

SPSH52C Tau Imaging. Scientific Tool or Diagnostic Biomarker?

Participants
Jonathan E. McConathy, MD, PhD, Saint Louis, MO (*Presenter*) Research Consultant, Eli Lilly and Company; Research Consultant, Blue Earth Diagnostics Ltd; Research Consultant, Siemens AG; Research support, GlaxoSmithKline plc

LEARNING OBJECTIVES

1) Participants will be familiar with the current status of PET tracers targeting tau that are being used in human research studies and understand their potential roles in therapeutic trials and clinical neuroimaging.

ABSTRACT

Imaging biomarkers for Alzheimer's disease (AD) and other neurodegenerative diseases are playing an increasingly important role in both research and patient care. Abnormal deposition of the tau and beta-amyloid proteins are pathologic hallmarks of AD, and several PET tracers targeting tau are now available for human research studies. The optimal use and sequencing of imaging biomarkers in the evaluation of cognitive impairment and dementia are active areas of investigation. In this presentation, current and potential future applictions of tau-PET will be discussed in the context of both research studies and possible clinical applications.

SPSH53

Hot Topic Session: 4D Flow Cardiac MRI

Thursday, Dec. 3 3:00PM - 4:00PM Location: S402AB

CA MR

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

FDA Discussions may include off-label uses.

Participants
J. Paul Finn, MD, Los Angeles, CA (*Moderator*) Research Grant, Bracco Group; ; ;
Robert M. Steiner, MD, Philadelphia, PA (*Moderator*) Consultant, Educational Symposia; Consultant, Johnson & Johnson

Sub-Events

SPSH53A 4D Flow: Overview of Techniques and Applications

Participants
James C. Carr, MD, Chicago, IL (*Presenter*) Research Grant, Astellas Group Research support, Siemens AG Speaker, Siemens AG Advisory Board, Guerbet SA

LEARNING OBJECTIVES

1) Understand the basic principles behind flow imaging with MRI. 2) Become familiar with various techniques for 4d flow. 3) Briefly introduce current and future clinical applications for 4D flow.

SPSH53B Assessment of Congenital Heart Disease with 4D Flow

Participants
Christopher J. Francois, MD, Madison, WI (*Presenter*) Research support, General Electric Company

LEARNING OBJECTIVES

1) How can 4D Flow MRI be used in congential heart disease? 2) What evidence supports the use of 4D Flow MRI in congenital heart disease? 3) What are current challenges of performing 4D Flow MRI in congential heart disease? 4) What are the future directions for 4D Flow MRI in congential heart disease?

ABSTRACT

How can 4D Flow MRI be used in congential heart disease? Free breathing high resolution magnetic resonance angiography Flow visualization Flow quantification What evidence supports the use of 4D Flow MRI in congenital heart disease? Summarize published data validating flow quantification and distribution in CHD What are current challenges of performing 4D Flow MRI in congential heart disease? Shorten scan time Respiratory and cardiac motion Accuracy of flow quantification What are the future directions for 4D Flow MRI in congential heart disease? Energy losses in CHD Combining 4D Flow MRI with computational fluid dynamics and 3D printing

URL

Active Handout:Christopher Jean-Pierre Francois

http://abstract.rsna.org/uploads/2015/15007123/SPSH53B.pdf

SPSH53C 4D Flow Applications in Adult Cardiovascular Diseases

Participants
Michael D. Hope, MD, San Francisco, CA, (michael.hope@ucsf.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Assess the potential clinical utility of recent advancements in 4D Flow imaging for adult cardiovascular disease. 2) Discuss possible clinical applications of unique 4D Flow hemodynamic parameters including regional aortic pulse wave velocity, flow displacement and helicity, and turbulence.

SPSH53D Clinical Processing of 4D Flow for Congenital and Acquired Structural Heart Disease

Participants
Albert Hsiao, MD, PhD, San Diego, CA, (hsiao@ucsd.edu) (*Presenter*) Founder, Arterys, Inc; Consultant, Arterys, Inc; Research Grant, General Electric Company

LEARNING OBJECTIVES

1) Clinical validation for quantitative flow and function. 2) Large volume data sets, data handling, compressed-sensing iterative reconstruction. 3) Background eddy-current correction. 4) Routine clinical cardiovascular 4D Flow cases.

Active Handout:Albert Hsiao

http://abstract.rsna.org/uploads/2015/15047996/SPSH53D.pdf

SPSH54

Hot Topic Session: Imaging-guided Radiation Therapy

Thursday, Dec. 3 3:00PM - 4:00PM Location: S404AB

CT MR NM RO

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Lei Xing, PhD, Stanford, CA (*Moderator*) Research Grant, Varian Medical Systems, Inc

Sub-Events

SPSH54A Projection and Volumetric X-ray Imaging and Their Roles in Image-Guided Radiation Therapy

Participants
Ning Jeff Yue, PhD, New Haven, CT, (yuenj@rutgers.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the current status of x-ray imaging modalities that are used in radiotherapy 2) Explain the roles and importance of 2D, 3D and 4D x-ray Imaging in radiotherapy. 3) Assess the limitation of current x-ray imaging modality in radiotherapy. 4) Explore the potential imaging technical advancement in radiotherapy.

ABSTRACT

SPSH54B Recent Advancements in PET/CT and PET/CT-Guided Radiation Therapy

Participants
Stephen R. Bowen, PhD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the role of 3D and 4D PET/CT in radiation therapy planning. 2) Understand the role of PET/CT in treatment response assessment for adaptive radiation therapy. 3) Describe image guidance techniques using PET/CT in charged particle therapy.

SPSH54C MRI-based Treatment Planning and Therapeutic Assessment - Where Do We Stand?

Participants
Lei Xing, PhD, Stanford, CA (*Presenter*) Research Grant, Varian Medical Systems, Inc

LEARNING OBJECTIVES

1) Present background knowledge of MR and MR simulation for radiation therapy. 2) Describe essential roles of MRI in radiation therapy treatment planning, target definition, treatment planning and verification, and therapeutic assessment. 3) Highlight recent advancements and emerging applications of MR imaging in radiation therapy.

SPSH55

Hot Topic Session: Cancer Screening: Breast Tomosynthesis, CT Colonography, Lung Cancer

Thursday, Dec. 3 3:00PM - 4:00PM Location: E451A

BR CH GI CT OI

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 1.00

Participants
Paul P. Cronin, MD, MS, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

SPSH55A Imaging in Breast Cancer Screening

Participants
Elizabeth S. Burnside, MD, MPH, Madison, WI (*Presenter*) Stockholder, NeuWave Medical Inc

LEARNING OBJECTIVES

1) To review the foundation and evolution of scientific investigation that supports evidence-based breast cancer screening. 2) To critically evaluate the methodologies currently being used to construct screening guidelines. 3) To understand the outcomes by which successful screening programs are measured. 4) To review and assess the current controversies of breast cancer screening.

ABSTRACT

URL

SPSH55B Imaging in Lung Cancer Screening

Participants
Ella A. Kazerooni, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

Honored Educators

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Ella A. Kazerooni, MD - 2014 Honored Educator

SPSH55C Imaging in Colon Cancer Screening

Participants
David H. Kim, MD, Madison, WI (*Presenter*) Consultant, Viatronix, Inc; Co-founder, VirtuoCTC, LLC; Medical Advisory Board, Digital ArtForms, Inc; Stockholder, Cellectar Biosciences, Inc

LEARNING OBJECTIVES

1) Be able to compare/contrast image-based screening by CT colonography (CTC) against the other screening options for colorectal cancer. 2) Be familiar with the major trials that establish the performance profile of CTC. 3) Understand the rationale for the selective polypectomy strategy at CT colonography.

MSCA52

Case-based Review of the Abdomen (An Interactive Session)

Thursday, Dec. 3 3:30PM - 5:00PM Location: S406A

GI US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Douglas S. Katz, MD, Mineola, NY, (dkatz@winthrop.org) (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review a series of clinically relevant, abdominal imaging cases, with audience participation. 2) To review important concepts and potential pitfalls of: the liver on sonography; the acute abdomen on US, CT, and MR; liver transplants on multi-modality imaging; genitourinary imaging; and trauma imaging. 3) To provide take home points for the audience based on specific actual case material which was instructional or problematic for the presenters.

ABSTRACT

Sub-Events

MSCA52A Abdominal Transplant Imaging

Participants
Matthew T. Heller, MD, Pittsburgh, PA, (hellermt@upmc.edu) (*Presenter*) Consultant, Reed Elsevier; Author, Reedl Elsevier

LEARNING OBJECTIVES

1) Describe normal post-operative imaging of liver transplantation. 2) Categorize the complications of liver transplantation and summarize common imaging findings. 3) Integrate the role of imaging in the treatment plan of the transplant patient.

ABSTRACT

Active Handout:Matthew Thomas Heller

http://abstract.rsna.org/uploads/2015/15002757/MSCA52A Hepatic Transplantation.pdf

MSCA52B Adrenal Imaging

Participants
Julie H. Song, MD, Providence, RI, (jsong2@lifespan.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the imaging appearances of common adrenal masses and review uncommon lesions. 2) Understand the principles of imaging characterization of adrenal masses and apply imaging tools appropriately. 3) Learn to avoid pitfalls and misdiagnoses of adrenal lesions.

MSCA52C Hepatic Sonography: Pearls and Pitfalls

Participants
Terry S. Desser, MD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Correctly identify common and uncommon sonographic pathology in the liver. 2) Use your understanding of basic sonographic and physiologic principles to infer the correct diagnosis in unusual ultrasound cases.

Active Handout:Terry S. Desser

http://abstract.rsna.org/uploads/2015/15002759/Active MSCA52C.pdf

MSCB52

Case-based Review of Breast (An Interactive Session)

Thursday, Dec. 3 3:30PM - 5:00PM Location: S100AB

BR SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Janie M. Lee, MD, Bellevue, WA (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the appropriate application of multimodality breast imaging for routine screening, supplemental screening, and diagnostic indications. 2) Select appropriate methods for performing imaging-guided percutaneous breast biopsy and post-biopsy radiologic-pathologic correlation. 3) Calculate performance measure values for a breast imaging audit and compare with appropriate benchmarks.

Sub-Events

MSCB52A Percutaneous Breast Biopsies

Participants
Wendy B. Demartini, MD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the advantages and limitations of percutaneous breast biopsy. 2) Compare the different potential methods of core needle biopsy. 3) Apply techniques for the biopsy of routine and challenging cases using mammography, ultrasound and MRI guidance.

ABSTRACT

MSCB52B Radiologic-Pathologic Correlation

Participants
Heidi R. Umphrey, MD, Birmingham, AL (*Presenter*) Research support, General Electric Company

LEARNING OBJECTIVES

View learning objectives under main course title.

MSCB52C Performance Measures

Participants
Janie M. Lee, MD, Bellevue, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the data to be collected and calculate performance measures for the basic clinically relevant breast imaging audit. 2) Compare audit results with appropriate performance benchmarks. 3) Understand additional data and calculations needed to perform a comprehensive breast imaging audit.

RC701

Thoracic MR: Ready for Prime Time!

Thursday, Dec. 3 4:30PM - 6:00PM Location: E353C

CH MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Jeanne B. Ackman, MD, Boston, MA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn what it takes to build a thoracic MR practice. 2) To understand how to create simple mediastinal, pleural, lung, and pulmonary MRA protocols which answer most clinical questions. 3) To become more comfortable interpreting these various types of thoracic MRI.

ABSTRACT

Despite MRI's long-demonstrated advantages in tissue contrast and diagnostic specificity and its absence of radiation, MRI remains an underutilized imaging modality in the thorax. The aim of this course is to cover the basics needed to build a thoracic MR practice and to perform and interpret thoracic MRI, whether of the thymus, the rest of the mediastinum, the pleura, or the lung. Fast and robust examination protocols, applicable and ready to use on currently available MR equipment, will be suggested. Clinical indications for thoracic MRI and commonly encountered lesions will be discussed. Performance and interpretation of pulmonary MRA for pulmonary embolism detection will also be covered.

Sub-Events

RC701A Non-Vascular Thoracic MRI: Building a Clinical Program

Participants
Jeanne B. Ackman, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

To understand the challenges, multifaceted approach, and benefit of building a clinical non-vascular thoracic MR practice.

ABSTRACT

There are many challenges to building a clinical non-vascular thoracic MR practice, many of which can be surmounted by: 1) identifying a knowledgeable and capable radiologist within your practice to take this initiative and build a team of interested colleagues to move forward2) educating technologists, referring physicians, trainees, and colleagues as to its performance, interpretation, and benefits,3) building a few simple MR protocols which can answer most clinical questions,4) regularly sharing MR cases to enhance the knowledge of your group,5) patience and recognition of the fact that those in your group insufficiently trained in thoracic MRI may not at first be comfortable with protocoling, interpreting, and recommending these examinations; these colleagues will need to be convinced of MR's benefits and, if interested, will be open to learning what they need to learn to maximize the benefits that can be achieved for patient care as a result of MR's higher tissue contrast, diagnostic specificity, and lack of ionizing radiation.

RC701B Basic Thymic MRI

Participants
Jeanne B. Ackman, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

The attendee will learn about basic Thymic MR protocoling and interpretation which will help distinguish: 1) Thymic cysts from solid thymic lesions. 2) Normal thymus and thymic hyperplasia from thymic tumors. 3) Low-risk thymomas from high-risk thymomas and lymphoma. 4) Invasive from non-invasive thymic masses.

ABSTRACT

It can be difficult by CT to distinguish between thymic cysts and solid lesions, thymic hyperplasia from thymic tumors, and thymoma from lymphoma. The purpose of this brief lecture is to cover the basics of thymic MR protocoling and interpretation in an effort to achieve these objectives and prevent unnecessary thymectomy.

RC701C Practical Mediastinal and Pleural Imaging

Participants
Constantine A. Raptis, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the key components of an MRI protocol tailored to investigate mediastinal pathology. 2) Review the imaging findings of commonly seen mediastinal pathologies which can be characterized with MRI. 3) Identify sequences which can be helpful in investigating pleural abnormalities. 4) Explore the MRI appearance of pleural fluid collections and soft tissue lesions.

ABSTRACT

RC701D MRI of the Lung: Why...When...How?

Participants
Juergen Biederer, MD, Gross-Gerau, Germany, (biederer@radiologie-darmstadt.de) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) to provide basic protocol suggestions for clinical lung MRI and 2) to make familiar with variations of this protocol for typical questions such as parenchymal, vascular or malignant diseases of the lung.

ABSTRACT

Frequently, customized lung imaging protocols are already available with the MR equipment. If not, setting up a protocol tree for lung imaging with MRI is straightforward using standard sequences for different pathologies: T2-w. fast spin echo (FSE) for infiltrates/soft lesions (1), T2-w. FSE with fat suppression for lymph nodes/bone lesions (2), Steady state free precession (SSFP) for respiratory motion/lung vasculature (3) and T1-w. 3D gradient echo (3D-GRE) for nodules/masses and airways (4). Optional sequences comprise MR angiography, dynamic contrast enhancement (DCE) for lung/tumor perfusion and diffusion weighted imaging (DWI) for lymph nodes/lesion characterization. The examination times range from 15' (standard) to 25' (all options).

RC701E How to Perform and Interpret Pulmonary MRA

Participants
Mark L. Schiebler, MD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Protocol a pulmonary MRA exam. 2) Determine what GBCA to use. 3) Problem solve common pulmonary MRA artifacts. 4) Correctly interpret Pulmonary MRA exams.

Active Handout:Mark L. Schiebler

http://abstract.rsna.org/uploads/2015/15001935/RC701E.pdf

RC702

Tips on Effective Educational Strategies for International Outreach

Thursday, Dec. 3 4:30PM - 6:00PM Location: S403A

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Kristen K. DeStigter, MD, Burlington, VT (*Moderator*) Medical Advisory Board, Koninklijke Philips NV; Luminary, McKesson Corporation; Research collaboration, Koninklijke Philips NV;

Sub-Events

RC702A 10 Tips for an Effective Teach the Teacher Model in Low-resource Settings

Participants
Kristen K. DeStigter, MD, Burlington, VT (*Presenter*) Medical Advisory Board, Koninklijke Philips NV; Luminary, McKesson Corporation; Research collaboration, Koninklijke Philips NV;

LEARNING OBJECTIVES

1) Evaluate low-resource settings for potential challenges to radiology education. 2) Determine opportunities that may lead to an effective teach the teacher program. 3) Synthesize and integrate best practice tips into educational programs in low-resource settings.

RC702B Establishing a Pediatric Radiology Fellowship as an International Education Outreach

Participants
Kassa Darge, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the need for supporting pediatric imaging as an international education outreach. 2) Develop a pediatric radiology fellowship curriculum suitable for an international outreach undertaking. 3) Execute an international pediatric radiology fellowship as part of educational outreach program.

ABSTRACT

In many economically less developed countries, the proportion of infant, children and adolescent population can be staggeringly high. The pediatric population can be as much as two-third of the total population. Despite this fact, even in those countries where some level of radiological services and residency program for radiology exist, pediatric imaging gets least priority. Many of these countries also do not even have a single pediatric radiologist. Thus supporting pediatric imaging in such countries within the context of an international education outreach is understandably justified. Collaborating with a local teaching hospital that has a radiology residency program and supporting the pediatric imaging is an easy first step to take. However, a long-term and sustainable way to improve pediatric imaging is to train the teachers in pediatric imaging i.e. conduct a pediatric radiology fellowship. This can be integrated in the institutional framework and provide a lasting and continuous support to pediatric imaging in the country. The example of the collaboration of Department of Radiology of The Children's Hospital of Philadelphia and the Department of Radiology of Addis Ababa University in Ethiopia will be used to illustrate how to establish a pediatric radiology fellowship as an international education outreach.

RC702C Global Health Radiology: Educational Principles and Strategies from RAD-AID

Participants
Erica Pollack, Denver, CO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To introduce principles and strategies for the assessment of radiology scarcity in low and middle income countries. 2) To summarize approaches used in Asia, Africa and Latin America for increasing radiology access. 3) To present key components of radiology service delivery in low and middle income countries, such as staff education, radiation safety, and image quality.

RC702D Effective Lecture Techniques for an International Audience

Participants
Eric J. Stern, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the potential barriers to learning when speaking to international audiences. 2) Raise awareness of possible cultural differences when teaching groups aborad. 3) Learn how to adapt your own teaching style and methods to internatioal audiences.

RC703

Imaging for Catheter Based Cardiac Intervention (TAVR, EP Procedures, Mitral Procedures)

Thursday, Dec. 3 4:30PM - 6:00PM Location: N229

CA IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC703A Mitral Valve Interventions

Participants
Philipp Blanke, MD, Vancouver, BC, (phil.blanke@gmail.com) (*Presenter*) Consultant, Edwards Lifesciences Corporation ; Consultant, Neovasc Inc

LEARNING OBJECTIVES

1) To review the anatomy and normal appearance of the mitral apparatus on cardiac CT. 2) To review common mitral valve pathologies including mitral annular calcifications, myxomatous degeneration, mitral valve prolapse and mitral stenosis and their appearance on cardiac CT. 3) To learn about recent advances in transcatheter mitral valve interventions and the role of preoperative computed-tomography.

ABSTRACT

1. To review the anatomy and normal appearance of the mitral apparatus on cardiac CT.2. To review common mitral valve pathologies including mitral annular calcifications, myxomatous degeneration, mitral valve prolapse and mitral stenosis and their appearance on cardiac CT.3. To learn about recent advances in transcatheter mitral valve interventions and the role of preoperative computed-tomography.

RC703B The Role of Imaging prior to TAVR

Participants
Jonathon A. Leipsic, MD, Vancouver, BC (*Presenter*) Speakers Bureau, General Electric Company Speakers Bureau, Edwards Lifesciences Corporation Consultant, Heartflow, Inc Consultant, Circle Cardiovascular Imaging Inc

LEARNING OBJECTIVES

1) Discuss the historical role of CTA in TAVR planning. 2) Review more recent data defining new applications for CT in TAVR planning. 3) Help define the potential future applications and role of MDCT in the future with new devices being introduced into the field.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Jonathon A. Leipsic, MD - 2015 Honored Educator

RC703C Imaging to Inform Electrophysiology (EP) and Other Interventions

Participants
Eric E. Williamson, MD, Rochester, MN, (Williamson.eric@mayo.edu) (*Presenter*) Research Grant, General Electric Company

LEARNING OBJECTIVES

1) Discuss the use of CT for preprocedure planning and postprocedure follow-up of electrophysiology (EP) interventions. 2) Describe expected and important unexpected findings on preprocedure CT used to guide EP intervention. 3) Describe common and uncommon complications of EP intervention as seen on postprocedure CT.

ABSTRACT

1. Discuss the use of CT for preprocedure planning and postprocedure follow-up of electrophysiology (EP) interventions2. Describe expected and important unexpected findings on preprocedure CT used to guide EP intervention3. Describe common and uncomon complications of EP intervention as seen on postprocedure CT

RC704

Musculoskeletal Tumors

Thursday, Dec. 3 4:30PM - 6:00PM Location: S406B

MK

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Mark D. Murphey, MD, Reston, VA, (MMurphey@acr.org) (*Director*) Nothing to Disclose

Sub-Events

RC704A Staging of Musculoskeletal Tumors

Participants
David M. Panicek, MD, New York, NY, (panicekd@mskcc.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the rationale and systems for staging musculoskeletal tumors. 2) List the components of local staging of musculoskeletal tumors at MRI. 3) Identify various MRI pitfalls in staging musculoskeletal tumors.

ABSTRACT

RC704B Dilemmas and Pitfalls in MSK Tumor Imaging

Participants
Mark D. Murphey, MD, Reston, VA, (MMurphey@acr.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the imaging differentiation of cystic lesions from myxoid neoplasms. 2) Understand the imaging appearance that allows distinction of hematoma from hemorrhagic neoplasm. 3) Identify the imaging characteristic of myositis ossificans. 4) Improve recognition of the concept of impending pathologic fracture and its clinical relevance.

Honored Educators

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Mark D. Murphey, MD - 2015 Honored Educator

RC704C Post-Treatment Imaging of MSK Tumors

Participants
Mark J. Kransdorf, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Construct a framework for evaluation of patients following treatment. 2) Recognize the spectrum of post treatment imaging findings. 3) Identify features to distinguish post treatment change from recurrent tumor.

ABSTRACT

Active Handout:Mark J. Kransdorf

http://abstract.rsna.org/uploads/2015/15001697/ACTIVE RC704C.pdf

RC704D Radiologic Treatment of MSK Tumors

Participants
Peter L. Munk, MD, Vancouver, BC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Familiarize the attendee with the most commonly used imaging guided per cutaneous thermal ablation techniques used in treatment of both benign tumours and metastatic disease involving the MSK system. 2) Review indications for radiologic treatment of bone tumors. 3) Examine the potential complications that can be encountered.

RC705

Pediatric Neuroradiology

Thursday, Dec. 3 4:30PM - 6:00PM Location: N230

NR PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Erin S. Schwartz, MD, Philadelphia, PA (*Moderator*) Nothing to Disclose
Bruno P. Soares, MD, Atlanta, GA (*Moderator*) Nothing to Disclose

Sub-Events

RC705A Imaging of the Developmentally Delayed Child

Participants
A. James Barkovich, MD, San Francisco, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) How to properly protocol an MRI of the brain for developmental delay. 2) How the proper protocol depends on the age of the patient at the time of the scan. 3) Where to get information to help you to perform the best sequences ('developmental delay' is often not sufficient).

ABSTRACT

Developmental delay is a common indication for brain imaging in children, most commonly in the first few years of life. To be a useful study, the imaging examination must assess the brain for the most common causes of delayed development. These include malformations (genetic or acquired), injury from prior vascular event or infection (pre- or postnatal), inborn errors of metabolism and phakomatoses. Sometimes the presenting history will give a clue that helps to protocol the scan, but other times it is not until the first or second sequence is reviewed that the cause of the delay begins to become clear. This lecture will discuss:1. The optimal imaging protocols for the diagnoses of these disorders2. Clues from imaging as to the etiology of the brain abnormality3. When additional sequences are necessary and how they should be performedThe following structures must always be assessed in Developmentally Delayed patients:a. Midline structures: cerebral commissures, hypothalamus, pituitary gland, tectum, 4th ventricle, cerebellar vermis, brain stem. b. Cerebral Cortex: too thick (pachygyria), too thin (injury or insufficient neuron production/migration), too few sulci (oligogyria), too many sulci (if tiny, consider polymicrogyria). c. White matter: If too little white matter, consider a primary axonal disorder, either axonal navigation or axonal formation. If too much white matter (much less common) consider an overgrowth syndrome. If hypomyelinated, consider metabolic hypomyelination syndrome or delayed myelination due to illness or malnutrition. If damaged white matter, think of infection (usually asymmetric), inflammatory condition, or metabolic disorder (usually symmetric and often associated with symmetric deep gray matter, brain stem or cerebellar white matter damage). If heterotopic gray matter is present, think of in utero ependymal disruption or malformation syndrome. d. Midline Structures: Look for interhemispheric fissure; if gray matter crosses the midline from one hemisphere to the other, consider holoprosencephaly. If septum pellucidum is absent, look for gray matter crossing midline, look for optic nerve hypoplasia, ectopic posterior pituitary or small anterior pituitary (Septo-Optic Dysplasia); also look at the cerebellum for missing vermis (rhombencephalosynapsis), especially if hydrocephalus is present. Look at cerebral acqueduct.e. Posterior fossa: Make sure the cerebellum is completely formed, is of normal size compared to the cerebrum and that the vermis and hemisphere are proportional. Make sure all the lobules of the vermis are present. Look at the brain stem for proper proportions of the midbrain, pons and medulla.

RC705B Evidence-based Imaging of the Traumatized Pediatric Spine

Participants
Erin S. Schwartz, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be familiar with the current evidence regarding the value of radiographs, computer tomography, and magnetic resonance imaging in the evaluation of the traumatized pediatrics spine. 2) Apply evidence-based imaging protocols to the evaluation of pediatric patients suspected of cervical spine trauma at your home institution.

ABSTRACT

Imaging of the traumatized pediatric spine has unique requirements due to the anatomy and injury patterns in the developing spine, susceptibility to soft tissue injury in the absence of fracture, and radiation dose sensitivity. Radiology Departments may be incorrectly applying imaging protocols developed for adult patients to "clear" their injured pediatric patients. Judicious use of radiographs, appropriately-dosed CT scanning, and MRI must be in the setting of a dedicated clinical protocol for the evaluation of the pediatric cervical spine. We will review the current literature on pediatric cervical spine trauma and the clinical/radiological pathway currently being implemented at The Children's Hospital of Philadelphia.

RC705C A Pattern-based Approach to Pediatric Metabolic Disease

Participants
Thierry Huisman, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Become familiar with frequent and less frequent metabolic diseases that may injure the neonatal brain. 2) How to apporach the imaging findings using a pattern recognition approach.

ABSTRACT

Neuroimaging pattern recognition in white matter disorders was initiated by Marjo van der Knaap and Jaap Valk, a pediatric neurologist and a pediatric neuroradiologist, and first published in 1991. This approach not only simplified and guided the diagnosis of many gray and white matter disorders, but also made it possible to cluster patients with identical or similar MR patterns, allowing further clinical, laboratory, genetic and molecular exploration. Multiple, initially unknown or unclassified disease entities could consequently be identified along this track.In the current lecture the pattern recognition approach will be discussed and applied in a variety of pediatric metabolic disorders to demonstrate its value in facilitating the correct diagnosis of inherited white and gray matter diseases. In addition, we will discuss why various patterns of neuroimaging findings are best explained.

RC706

The Temporal Bone: Anatomy, Inflammation and Tumors

Thursday, Dec. 3 4:30PM - 6:00PM Location: E450A

HN NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC706A Temporal Bone Imaging: Anatomy

Participants
John I. Lane, MD, Rochester, MN, (lane.john@mayo.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The learner will be able to easily identify the clinically relevant anatomic structures of the temporal bone after completing the course. 2) The learner will have a better appreciation of the orientation of the auditory ossicles and the benefits of multiplanar oblique reconstructions from MDCT datasets for demonstrating normal ossicular anatomy and pathology. 3) The learner will have a better appreciation of the normal and pathologic appearance of the cochlea, vestibule, semicircular canals, and vestibular aqueduct on high resolution CT and MR.

RC706B Temporal Bone Imaging: Inflammation

Participants
Joel D. Swartz, MD, Gladwyne, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The learner will be able to understand and analyze the most common varieties of inflammation involving the external auditory canal, middle ear, mastoid and inner ear. 2) The learner will understand the appropriate use of computed tomography and MRI. 3) The learner will be able to differentiate cholesteatoma from other middle ear maladies and understand the pathophysiology of the entities discussed in the presentation. 4) The learner will understand the imaging approach to inner ear inflammation.

ABSTRACT

This presentation will follow an anatomically organized template. The external ear entities emphasize will include necrotizing external otitis, keratosis obturans, granulation tissue and EAC cholesteatoma. There will be special attention to middle ear cholesteatoma with a discussion of diffusion weighted imaging and differentiation of this lesion of granulation tissue and cholesterol granuloma. The pathophysiology of labyrinthitis will also be emphasized.

RC706C Temporal Bone Imaging: Tumor

Participants
Amy F. Juliano, MD, Boston, MA, (amy_juliano@meei.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand temporal bone anatomy and identify the various portions of the temporal bone. 2) Know the most common neoplasms that occur in different areas of the temporal bone, and recognize their imaging characteristics. 3) Know the differential diagnosis of tumors in the temporal bone region by location and imaging appearance.

ABSTRACT

Temporal bone neoplasms are overall not very common. It is useful to think of the temporal bone in terms of its various subsites, as the tumors that may be found in each subsite is different, and being able to localize an imaging finding to a particular subsite greatly aids in establishing a differential diagnosis. When there are classic imaging features, one can even quite easily arrive at the specific diagnosis. The subsites to be discussed are: the internal auditory canal/cerebellopontine angle cistern, middle ear cavity, mastoid, external auditory canal, petrous apex, and the facial nerve.

RC707

GU Ultrasound 2015: The Expert's Update on Kidney, Gynecologic and Testicular US

Thursday, Dec. 3 4:30PM - 6:00PM Location: N227

GU OB US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
John J. Cronan, MD, Providence, RI (*Coordinator*) Nothing to Disclose
Mindy M. Horrow, MD, Philadelphia, PA, (horrowm@einstein.edu) (*Presenter*) Spouse, Director, Merck & Co, Inc
Paula J. Woodward, MD, Salt Lake City, UT (*Presenter*) Vice President, Reed Elsevier

LEARNING OBJECTIVES

1) The learner will be made aware of the importance of acute kidney injury (AKI) and associated ultrasound findings. 2) Ultrasound criteria of cystic adnexal masses will be reviewed. 3) Testicular and scrotal pathology and the importance of ultrasound will be explained.

ABSTRACT

Ultrasound has taken on new importance in the evaluation of the kidney, female pelvis and the scrotum/ testicles. We will explain the ultrasound findings of acute kidney injury (AKI), the evaluation of pelvic masses and the necessary follow-up. Finally, a review of the testicle and ultrasound findings will complete the course.

Honored Educators

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Mindy M. Horrow, MD - 2013 Honored Educator

RC708

Imaging of the Extremities (An Interactive Session)

Thursday, Dec. 3 4:30PM - 6:00PM Location: E450B

MK ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC708A Orthopedic Hardware: All You Wanted to Know

Participants
Manickam Kumaravel, MD, FRCR, Houston, TX, (Manickam.Kumaravel@uth.tmc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the various types of orthopedic hardware in musculoskeletal imaging practice. 2) Understand the functionality of orthopedic hardware. 3) Identify the adequate positioning of hardware 4) Diagnose malpositioning and complications of hardware placement and guide treatment.

ABSTRACT

Radiologists are routinely faced with images containing orthopedic hardware. Appropriate recognition of various types of hardware is crucial for the continuation of patient care. The lecture will explain the functionality of orthopedic hardware. Illustrations of the appearance of orthopedic hardware will be made with cartoons, radiographs and Computed Tomography (CT). The attendee will be educated about identification of type of hardware; adequacy of hardware and emphasis will also be placed on diagnosis, complications and malposition of common orthopedic hardware.Guidance will also be provided with regard to appropriate report formulation.

RC708B Ankle and Foot

Participants
Ken F. Linnau, MD, MS, Seattle, WA, (klinnau@uw.edu) (*Presenter*) Speaker, Siemens AG; Royalties, Cambridge University Press;

LEARNING OBJECTIVES

1) To identify clinical scenarios which may require advanced foot and ankle imaging in the emergency department in addition to radiography. 2) To select appropriate imaging modality and exam parameters for advanced foot and ankle imaging on CT, MR and sonography. 3) To identify radiographic, CT, MR and ultrasound findings of complex or subtle foot and ankle injuries in order to aide in efficient clinical decision making and treatment planning.

ABSTRACT

The foot and ankle are very commonly injured in extremity trauma. Radiographs are the most common initial imaging study for evaluation of foot and ankle injuries. Unfortunately, radiography can be of limited utility for complete assessment of the bones and soft tissues of the foot and ankle. As a result advanced imaging, including CT, MRI or sonography may be helpful to fully characterize injuries and aid in treatment decision making. The purpose of this interactive presentation is to highlight injuries and clinical settings which may require expedited advanced imaging of the foot and ankle in addition to radiography while the patient is still in the emergency room.

RC708C Pelvis

Participants
Bharti Khurana, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the key factors that contribute to pelvic stability. 2) Recognizt the patterns of osseous and soft-tissue injuries in pelvic fractures.

ABSTRACT

Treating trauma patients with displaced pelvic fractures requires a multidisciplinary approach at a designated trauma center to reduce morbidity and mortality. Immediate recognition of pelvic ring disruption and determination of pelvic stability are critical components in the evaluation of such patients. Stability is achieved by the ability of the osseoligamentous structures of the pelvis to withstand physiologic stresses without abnormal deformation. The supporting pelvic ligaments, including the posterior and anterior sacroiliac, iliolumbar, sacrospinous, and sacrotuberous ligaments, play a crucial role in pelvic stabilization. Radiologists should be familiar with the ligamentous anatomy and biomechanics relevant to understanding pelvic ring disruptions, as well as the Young and Burgess classification system, a systematic approach for interpreting pelvic ring disruptions and assessing stability on the basis of fundamental force vectors that create predictable patterns. This system provides an algorithmic approach to interpreting images and categorizes injuries as anterioposterior (AP) compression, lateral compression, vertical shear, or combined. Opening and closing of the pelvis from rotational forces result in AP compression and lateral compression injuries, respectively,

whereas vertical shear injuries result from cephalad displacement of the hemipelvis. AP and lateral compression fractures are divided into types 1, 2, and 3, with increasing degrees of severity. Knowledge of these injury patterns leads to prompt identification and diagnosis of other subtle injuries and associated complications at pelvic radiography and cross-sectional imaging, allowing the orthopedic surgeon to apply corrective forces for prompt pelvic stabilization

Honored Educators

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Bharti Khurana, MD - 2014 Honored Educator

RC709

Biliary - Potpourri (An Interactive Session)

Thursday, Dec. 3 4:30PM - 6:00PM Location: E353B

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC709A Cholangiocarcinoma

Participants
Kartik S. Jhaveri, MD, Toronto, ON (*Presenter*) Speaker, Bayer AG

LEARNING OBJECTIVES

1) Review Diagnosis and Mimics of Cholangiocarcinoma. 2) Discuss Classification and Imaging Appearances of Cholangiocarcinoma. 3) Highlight Role of Imaging in Staging and Resectrability Evaluation of Cholangiocarcinoma.

ABSTRACT

RC709B Benign Biliary Disease

Participants
Ivan Pedrosa, MD, Dallas, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Demonstrate the MRI findings in common and uncommon benign biliary disease. 2) Convey available MRI techniques and protocols for evaluation of benign biliary disease. 3) Illustrate common pitfalls that can mimic benign biliary disease.

Active Handout:Ivan Pedrosa

http://abstract.rsna.org/uploads/2015/15001887/RC709B Pedrosa 20m.pdf

RC709C Biliary Post-op Complications

Participants
Chandana G. Lall, MD, Orange, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand nderlying mechanism of iatrogenic biliary injury. 2) Review of biliary anatomy: Anatomic variants which may predispose to injury. 3) MR Imaging features of iatrogenic biliary injury . 4) Classification of biliary injuries. 5) Role of hepatobiliary agents in workup of biliary injury.

ABSTRACT

Surgical procedures and underlying mechanism for iatrogenic biliary injury Biliary anatomy: Anatomic variants which may predispose to injury Imaging features of iatrogenic biliary injury on MR Imaging Classification system in assessing biliary injuries Role of hepatobiliary agents

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Chandana G. Lall, MD - 2013 Honored Educator

RC709D Biliary Cases I Missed

Participants
John P. McGahan, MD, Sacramento, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To familiarize the audience with common imaging pitfalls when evaluating the biliary system. 2)To help the audience avoid common mistakes when evaluating the biliary tract with either MRI or CT. 3) To demonstrate to the audience what devasting consequences that may occure when suggesting a specific wrong diagnosis.

RC710

Thyroid and Neck Ultrasound (An Interactive Session)

Thursday, Dec. 3 4:30PM - 6:00PM Location: S402AB

HN NR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC710A Thyroid Nodules: When and What to Biopsy

Participants
Jill E. Langer, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the sonographic characteristics that are associated with a high probability that a thyroid nodule is likely malignant or likely benign. 3) Gain an understanding of the rationale of the current guidelines for recommending thyroid fine needle aspiration.

ABSTRACT

As an overview, this presentation will review the epidemiology of thyroid nodules and correlate the sonographic findings with the risk of malignancy or the likelihood that the appearance represents a benign hyperplastic thyroid nodule rather than a true neoplasm. Additionally, the rationale for current guidelines for recommending thyroid fine needle aspiration will be discussed. The prevalence of palpable thyroid nodules is estimated to be 6.4% in women and 1.5% in men between 30 to 60 years of age, living in iodine-sufficient regions. However, high resolution sonography of the neck has been shown to be a much more sensitive technique than palpation, detecting nodules in 19 to 67% of randomly selected adults, with detection rates greater in women and increasing with age for both genders. Fortunately the vast majority of sonographically detected thyroid nodules are benign, hyperplasic regions of the thyroid. Fine-needle aspiration biopsy (FNA) is still considered the most reliable diagnostic test to determine if a thyroid nodule is malignant. Malignant nodules account for approximately 5% of all nodules that undergo palpation-guided FNA and approximately 10 to 15% of nodules that undergo sonography-guided FNA procedures. Analysis of the sonographic features of thyroid nodules has become the preeminent non-invasive tool for analyzing the risk of malignancy of thyroid nodules and aids in selecting which nodules should undergo fine needle aspiration (FNA). A number of recently published guidelines and consensus statements emphasize that the sonographic appearance of a nodule is a superior predictor of malignancy compared with nodule size or palpability and that when sonographic features of malignancy are noted, the nodule should undergo FNA. A number of sonographic features have shown a high specificity for the diagnosis of thyroid cancer and include marked hypoechogenicity, the presence of microcalcifications, infiltrating or micro-lobulated borders, and a taller-

RC710B Post-Thyroidectomy Neck

Participants
Carl C. Reading, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize the sonographic appearance of recurrent and metastatic disease, and other abnormalities, in the post-operative neck.

ABSTRACT

In the post-thyroidectomy neck, ultrasound surveillance is a highly effective method to evaluate for residual and recurrent disease. Recurrence can occur anywhere within the neck, but typically is located in the mid and low internal jugular chains and thyroid bed region. Abnormal cervical lymph nodes can be recognized with a high degree of accuracy due to abnormal size, shape, internal architecture, and color Doppler appearance. In patients with suspected metastatic papillary cancer, the presence of internal fluid or calcifications is highly predictive of malignancy. Abnormal nodal color Doppler flow including peripheral (non-hilar), increased, and irregular flow is highly predictive of malignancy. Within the post-operative thyroid bed, itself, residual thyroid tissue, tumor recurrence, and suture granulomas can occur. FNA for cytologic analysis of suspected abnormalities can be performed, and the addition of thyroglobulin and calcitonin assay of the specimen, for papillary and medullary cancer, respectively, adds a high degree of accuracy to this procedure.

RC710C Parathyroid and Other Neck Masses

Participants
Mary C. Frates, MD, Sharon, MA, (mfrates@partners.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify abnormal parathyroid glands based on sonographic characteristics 2) Develop an accurate differential for cystic lesions in the neck based on sonographic characteristics, lesion location and clinical circumstances. 3) List the most common etiologies of solid lesions located between the thyroid and the superior mediastinum.

ABSTRACT

RC711

Advances and Updates in SPECT/CT

Thursday, Dec. 3 4:30PM - 6:00PM Location: S504CD

CT NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

Sub-Events

RC711A SPECT/CT in Musculoskeletal Diseases

Participants
Christopher J. Palestro, MD, New Hyde Park, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the role of SPECT/CT in the workup of patients with malignancy. 2) Describe the role of SPECT/CT in musculoskeletal infection. 3) Use SPECT/CT to improve the accuracy of radionuclide studies for diagnosing musculoskeletal diseases.

ABSTRACT

RC711B SPECT/CT in Endocrine Disorders and Others

Participants
Esma A. Akin, MD, Washington, DC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Through clinical case examples, this activity aims to refresh knowledge of SPECT-CT applications with emphasis on neuroendocrine disorders as well as parathyroid imaging.

ABSTRACT

RC712

Thoracic Aorta: The Essentials (An Interactive Session)

Thursday, Dec. 3 4:30PM - 6:00PM Location: S103CD

CH VA

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Dominik Fleischmann, MD, Palo Alto, CA (*Moderator*) Research support, Siemens AG;

Sub-Events

RC712A The Spectrum of Type A Dissections

Participants
Anne S. Chin, MD, Palo Alto, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the pathology, epidemiology, and natural history of acute type A aortic dissection. 2) Describe the imaging strategies and diagnostic information sought in patients with acute aortic syndromes. 3) Review the recent classification of acute aortic dissection. 4) Illustrate imaging findings of the spectrum of acute type A aortic dissection, with a focus on recognizing subtle CT angiographic findings related to the lesser known 'Class 3' aortic limited intimal tear or limited dissection.

ABSTRACT

The traditional Stanford classification distinguishes between dissections involving the ascending aorta (Type A) from those that do not involve the ascending aorta (Type B). Type A aortic dissection is rare, but remains the most lethal of aortic disorders requiring prompt surgical intervention. The common pathologic denominator in patients with acute dissection is an abnormal aortic media ('cystic medial necrosis') which can be found in genetic/inherited diseases (e.g. Marfan's) but also in patients with severe hypertension. The CT imaging strategy of suspected acute aortic syndrome should always include (i) non-enhanced images to assess for intramural hematoma (IMH); when the index of suspicion for aortic dissection is high, also consider (ii) EKG-gating for motion-free evaluation of the aortic root/ascending aorta, and (iii) including common femoral arteries in the CTA scan range to assess lesion extent and identify a percutaneous access route. The spectrum of aortic dissection has recently been classified as the following: Class 1 classic dissection with true and false lumen separated by an intimal flap; Class 2 IMH; Class 3 discrete or limited dissection; Class 4 penetrating atherosclerotic ulcer (PAU); and Class 5 iatrogenic/traumatic. A clarification and modified conceptual classification of aortic dissection will be provided, along with illustrative examples of these aortic lesions. Particular focus will be given to the lesser known Class 3 'limited intimal tear' which is described as a subtle and eccentric bulge of the aortic wall. While it has been reported to elude current imaging techniques, emphasis will be made on recognizing subtle CTA imaging findings characteristic of this uncommon but important dissection variant.

RC712B Surgical Procedures and Complications

Participants
Terri J. Vrtiska, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe common indications for surgical intervention in thoracoabdominal aortic disease including aneurysm, vasculitis, infection, trauma and connective tissue disorders. 2) Identify key CTA features of the normal postoperative thoracoabdominal aorta. 3) Present the characteristic CTA findings for complications of postoperative aortic repair including disease progression, thrombosis, stenosis, infection, pseudoaneurysm, aorto-enteric fistula and aortic rupture.

ABSTRACT

Surgical procedures and complications of the thoracoabdominal aorta

RC712C Traumatic Aortic Injuries

Participants
Savvas Nicolaou, MD, Vancouver, BC (*Presenter*) Institutional research agreement, Siemens AG

LEARNING OBJECTIVES

1) Discuss the different mechanisms of injuries, pathophysiology, and types of traumatic aortic injuries including aortic dissection, laceration, transection, pseudoaneurysm and intramural hematoma. 2) Review techniques and advances in imaging including DECT/Spectral and ultra-high-pitch imaging to optimize imaging of traumatic aortic injuries and the role of gating, MRI, and TEE. 3) Discuss and demonstrate examples of the grading scheme for traumatic aortic injuries. 4) Demonstrate imaging pitfalls which can cause misinterpretation of traumatic aortic injuries. 5) Review the appropriate management and treatment options, including open surgical repair and percutaneous endovascular repair, for the traumatic aortic injuries.

ABSTRACT

RC713

Pediatric Fetal (An Interactive Session)

Thursday, Dec. 3 4:30PM - 6:00PM Location: E351

CH GI HN NR OB PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC713A Fetal Ear and Orbital Anomalies

Participants
Maria A. Calvo-Garcia, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify major fetal external ear and orbital malformations. 2) Apply useful search patterns during US and fetal MRI evaluation of external ear and orbital anomalies.

ABSTRACT

Assessment of the fetal face is an important part of the sonographic structural survey. Craniofacial abnormalities occur as an isolated phenomenon or in the context of syndromes, chromosomal abnormalities or environmental insults.Along the course of this presentation we will review the standard facial anatomic survey with US and the main embryologic steps involved in the development of the face. Subsequently we will discuss major malformations involving the external ear and orbits and their expected association. The presentation will include clinical cases evaluated with US and fetal MRI and their postnatal correlations.

RC713B Fetal Chest Anomalies

Participants
Teresa Victoria, MD, PhD, Philadelphia, PA, (victoria@email.chop.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss the most common fetal lung masses. 2) To identify imaging algorithms and patterns that can be helpful in reaching a diagnosis.

ABSTRACT

Accurate diagnosis of fetal lung lesions is crucial for appropriate counseling and management of the abnormalities in hand. During the lecture, the normal appearance of the fetal chest will be briefly done, in order to approach a review of the most common pulmonary lesions encountered during the fetal period. Diagnostic clues that will guide accurate diagnosis will be discussed. Rare lung lesions and their imaging diagnostic approach will also be discussed.

RC713C Fetal GI Anomalies

Participants
Erika Rubesova, MD, Stanford, CA (*Presenter*) Researcher, Siemens AG

LEARNING OBJECTIVES

1) After the presentation, the learners should be able to recognize the normal appearance of developing fetal bowel, as well as the most common and uncommon presentations of congenital bowel anomalies on ultrasound and MRI. They will become familiar with the specific information provided by each of the two modalities. The course will present a review of bowel anomalies of the fetus and will be illustrated by representative cases with the objective for the learners to understand the systematic approach of image analysis that can lead to the accurate diagnosis or limited list of differential diagnoses.

ABSTRACT

Diagnosis of fetal bowel anomalies usually presents on ultrasound as bowel dilatation or echogenic bowel. Echogenic bowel is associated with multiple other congenital conditions such as chromosomal anomalies, viral infections or cystic fibrosis. Dilatation of bowel may have various etiologies and systematic review of the findings including bowel wall thickening, number of distended bowel loops or the increased echogenicity of the content may help to localize bowel obstruction and narrow the list of differential diagnosis. Fetal MRI adds precious information to the ultrasound thanks the larger field of view, better tissue contrast but mainly thanks to high T1 signal intensity of meconium. Meconium is formed in the entire bowel and accumulates in the rectum that acts as a reservoir. While meconium is seen in the small bowel and colon in the second trimester, it is mainly seen in the fetal colon after 30 weeks of gestational age. Meconium acts as intraluminal contrast, similar to a barium enema. Systematic review of the distribution of meconium and analysis of the bowel caliber in comparison to normal values for gestational age helps to establish or narrow the list of differential diagnoses of fetal gastrointestinal abnormalities. In this presentation, we will review the advantages and limitations of ultrasound and MRI for diagnosis of fetal anomalies, we will discuss and illustrate, by representative cases, the approach to the most common and some more rare or atypical congenital bowel anomalies on ultrasound and MRI, in order to establish a single or short list of differential diasnoses.

Handout:Erika Rubesova

http://abstract.rsna.org/uploads/2015/15002067/Rubesova GI RSNA 2015.pptx

RC714

Venous Disease

Thursday, Dec. 3 4:30PM - 6:00PM Location: S504AB

IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Anne C. Roberts, MD, La Jolla, CA (*Presenter*) Nothing to Disclose
Gerant M. Rivera-Sanfeliz, MD, San Diego, CA, (gerantrivera@ucsd.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Decide on the appropriate patients to undergo venous ablation. 2) Know various tools used for venous ablation. 3) Understand some of the issues of large vein occlusions and possible treatments. 4) Gain familiarity with the presentation pelvic congestion and varicocele. 5) Have a familiarity with the treatment of pelvic congestion and varicoceles.

ABSTRACT

Lower leg varicosities are a very common problem. Over the last 10 years there has been increasing interest in the percutaneous treatment of varicosities. The patient population with varicosities, the presentation of varicosities, and the treatment of varicosities will be presented. Other venous anomalies can worse the symptoms of varicosities and may need to be treated. These include May-Thurner syndrome, pelvic congestion, and the male variant of pelvic congestion syndrome (varicoceles). The patient population, symptoms and presentations, and the treatment of these other venous abnormalities will also be discussed.

Active Handout:Gerant M. Rivera-Sanfeliz

http://abstract.rsna.org/uploads/2015/13010573/ACTIVE RC714.pdf

RC715

Digital Breast Tomosynthesis

Thursday, Dec. 3 4:30PM - 6:00PM Location: N228

BR DM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC715A Basics and Implementation

Participants
Liane E. Philpotts, MD, New Haven, CT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define the essential steps involved in initiating tomosynthesis into practice. 2) Identify the key elements needed to implement tomosynthesis including educating patients and referring providers, marketing, and reimbursement issues. 3) Discuss performance issues such as interpretation time, learning curve, and workflow with tomosynthesis. 4) Anticipate changes in practice over time as a result of tomosynthesis, including fewer patients requiring follow up (BIRADS 3) and improved PPVs for biopsy recommendations, which may lead to changes in staffing or equipment needs.

ABSTRACT

Initiating tomosynthesis into practice requires some important considerations. These include training requirements for technologists and radiologists, equipment needs, workstation essentials, PACS storage and retrieval, dose considerations and scheduling. Educating patients and physicians is important to permit weighing benefits versus increased dose. Marketing can be an important factor for some practices looking to increase services and volumes. Coding is now available and reimbursement issues will be considered. Changes in workflow can be profound and unanticipated initially. In addition to reduced recalls from screening, fewer patients will require close diagnostic follow-up therefore diminishing the diagnostic pool over time. Diagnostic exams are also streamlined, all leading to expediting the imaging workflow of patients. This can lead to changes in total equipment or staffing needs. Overall there is a net benefit as more patients will need less imaging and get more accurate reads.

RC715B Clinical Utility of DBT

Participants
Stamatia V. Destounis, MD, Scottsville, NY (*Presenter*) Research Grant, FUJIFILM Holdings Corporation; Research Grant, Hologic, Inc; Research Grant, QT Ultrasound LLC

LEARNING OBJECTIVES

1) Principles of Digital Breast tomosynthesis (DBT). 2) Initial implementation of DBT in a clinical practice and living in a hybrid Full Field Digital Mammography (FFDM) and Digital Breast Tomosynthesis (DBT) environment. 3) Initial training and education of physicians and technologists within the practice and changes in workflow. 4) Education of patients and referring health care providers. 5) Financial concerns with initiation and implementation of DBT. 6) Synthetic view implementation and reimbursement changes.

ABSTRACT

Review of basic principles of Digital Breast Tomosynthesisand clinical benefits. Review of current literature on clinical implementation of Digtal Breast Tomosynthesis. Outlining how a facility may embark on DBT implementaiton in a private practice setting. The costs and shortcomings of utilizing two modalities Full Field Digital and Digital Breast Tomosynthesis daily as the facility/department transitions from one modality to another.Educating your team of the changes that will be implemented is extemely important. The need for strong leadership from your technologists on required education and training, requirements of strong IT and PACS support, the issues and costs of archiving and storage of the large DBT files will be reviewed. Education of referring health care providers and the patients on the new technology is key to making a successful transition to a new modality. Marketing in the community through presentations, brochures and the facility's website will bring awareness and help implementation initiation and acceptance.Review of the synthetic view and its importance in answering radiation concerns . Recent reimbursement approval and its meaning in the clinical practice.

RC715C Challenging Cases

Participants
Catherine M. Appleton, MD, Saint Louis, MO (*Presenter*) Scientific Advisory Board, Hologic, Inc; Royalties, Oxford University Press;

LEARNING OBJECTIVES

1) List appropriate clinical applications of digital Breast tomosynthesis using a cases based approach. 2) Review problem solving techniques to resolve challenging findings in screening and diagnostic digital Breast tomosynthesis cases. 3) Recognize common pitfalls in digital breast tomosynthesis using a case based approach.

ABSTRACT

Using an enriched case set, common findings encountered using DBT in the screening and clinical settings will be reviewed - to include challenging diagnostic findings, calcifications, pitfalls, and multi modality correlation.

RC716

Radiological and Nuclear Terrorism: Like It or Not, Radiology Professionals Will Be in the 'Hot' Seat

Thursday, Dec. 3 4:30PM - 6:00PM Location: S103AB

HP OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Donald P. Frush, MD, Durham, NC (*Moderator*) Nothing to Disclose
John Lanza, MD, Pensacola, FL, (JohnJ.Lanza@FLHealth.gov) (*Presenter*) Nothing to Disclose
Nick Dainiak, MD, Oak Ridge, TN, (Nick.Dainiak@orau.org) (*Presenter*) Nothing to Disclose
Judith L. Bader, MD, Bethesda, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe the scenarios for an radiological dispersal device (RDD) or improvised nuclear device (IND). 2) To discuss roles of federal, state, and local governments. 3) To review the roles and strategies of hospital teams, including radiology professionals in the setting of an RDD/IND. 4) To provide resources for radiology professionals for response in the setting of RDD/IND. 5) Describe the very large mass casualty scenarios of concern that radiologists might be called to help with. 6) Understand is the difference between radiation contamination and exposure. 7) Understand the clinical strategies used to manage contamination and exposure. 8) Identify internet resources physicians can use to inform themselves about preparing for and participating in responses to these types of incidents.

ABSTRACT

URL

http://escambia.floridahealth.gov/programs-and-services/emergency-preparedness-and-response/_documents/rsna-radiological-professional-ppt.pptx

RC717

Elastography-Imaging Tissue Stiffness: Approaches and Applications

Thursday, Dec. 3 4:30PM - 6:00PM Location: S505AB

MR US PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Juergen K. Willmann, MD, Stanford, CA (*Moderator*) Research Consultant, Bracco Group; Research Consultant, Triple Ring Technologies, Inc; Research Grant, Siemens AG; Research Grant, Bracco Group; Research Grant, Koninklijke Philips NV; Research Grant, General Electric Company

LEARNING OBJECTIVES

1) To understand the principle technical aspects of ultrasound and MR elastography. 2) To learn clinical applications of elastography. 3)To learn the advantages and disadvantages of ultrasound and MR elastography for assessing tissue stiffness in various organs.

Sub-Events

RC717A US Elastography of the Liver

Participants
Richard G. Barr, MD, PhD, Campbell, OH (*Presenter*) Consultant, Siemens AG; Consultant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, SuperSonic Imagine; Speakers Bureau, Koninklijke Philips NV; Research Grant, Bracco Group; Speakers Bureau, Siemens AG; Consultant, Toshiba Corporation; Research Grant, Esaote SpA

LEARNING OBJECTIVES

1) To describe the clinical need for liver stiffness evaluation. 2) To describe the principles of ultrasound shear wave liver elastography To review the technique of shear wave liver elastography. 3) To discuss pitfalls in performing and interpreting ultrasound liver elastography To describe the basic approach to interpret ultrasound liver elastography.

ABSTRACT

Diffuse liver disease is one of the major health problems in the world. Hepatitis C (HCV) and Hepatitis B (HBV) viruses are the leading causes of chronic liver disease. It is estimated that 180 million and 350 million people worldwide are chronically infected with HCV and HBV respectively. In western countries, liver disease caused by HCV is the main indication for liver transplantation. Liver biopsy has been considered the reference standard for fibrosis assessment and stage classification. However, biopsy is invasive, with potential complications that can be severe in up to 1% of cases. In addition, a liver biopsy represents roughly 1/50,000 of the liver volume and there is interobserver variability at microscopic evaluation. Elastography is a non-invasive method for liver fibrosis assessment and has been an area of intense research. With ultrasound elastography systems now widely available worldwide this technique is beginning to replace liver biopsy as method for diagnosis and follow-up of liver fibrosis. This technique is easy to perform but requires attention to detail. This course will review the principles of shear wave elastography (SWE) for liver fibrosis assessment. A review of the technique and pitfalls will be presented. The literature will be reviewed as well as published guidelines on the use of SWE for liver fibrosis assessment. A discussion of the clinical applications of this technique and future potential applications will be discussed.

RC717B Non-liver Applications of US Elastography

Participants
Anthony E. Samir, MD, Boston, MA, (ASAMIR@mgh.harvard.edu) (*Presenter*) Consultant, Pfizer Inc; Consultant, General Electric Company; Consultant, PAREXEL International Corporation; Research Grant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, Toshiba Corporation; Research Grant, General Electric Company; Research Grant, Samsung Electronics Co, Ltd; Research Grant, Analogic Corporation; Research support, SuperSonic Imagine; Research support, Hitachi, Ltd

LEARNING OBJECTIVES

1) This refresher course provides a summary of current state-of-the-art Ultrasound (US) elastography methods in non-hepatic conditions including thyroid nodules, prostate cancer, deep vein thrombosis and renal fibrosis and neoplasms.

ABSTRACT

(1) A brief discussion of the evolution of SE over 20 years; physics primer including tissue elasticity, strain, shear wave and Young modulus; classification: quasi-quantitative method (strain elastography, elasticity ratio), quantitative methods by shear wave and comparison of various methods in terms of their advantages and limitations.(2) A discussion of applications of SE techniques in non-hepatic conditions. We compare diagnostic performance and reliability advantages and limitations of various SE techniques.A. Thyroid:SE methods can be used for differentiating benign and malignant thyroid nodules. It may be especially helpful for a group of indeterminate nodules with follicular lesions finding on fine needle aspirationB. Kidney:SE may be useful for detecting renal fibrosis. SE may also has adjunctive role in diagnosis of renal masses.C. Prostate:The main role of SE is prostate cancer detection, and assistance with biopsy targeting.D. Pancreas:SE methods can be used to evaluate the pancreas by upper gastrointestinal endoscopy.E. Deep vein thrombosis:Main clinical application of SE can be measuring time-dependent viscoelastic properties (aging) of blood clots in venous system.SE is a rapidly evolving set of methods that have a promising role as a biomarker in various pathologic conditions through providing information about the physical properties of the tissues that is complementary to that provided by other modalities.

MR Elastography

Richard L. Ehman, MD, Rochester, MN (*Presenter*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc; Research Grant, Resoundant, Inc

LEARNING OBJECTIVES

1) To describe the rationale for tissue elasticity imaging. 2) To describe the basic physical approach for MRI-based elasticity imaging. 3) To describe the most common indications for MR elastography of the liver. 4) To describe the basic approach to interpretation of hepatic MR elastography exams. 5) To describe pitfalls in interpretation of hepatic MRE. 6) To describe other potential applications of MRE.

ABSTRACT

Many disease processes cause profound changes in the mechanical properties of tissues. This accounts for the efficacy of palpation for detecting abnormalities and provides motivation for developing practical methods to assess tissue elasticity. Magnetic Resonance Elastography (MRE) is a new commercially-available MRI-based technique that can quantitatively image the mechanical properties of tissue. The most advanced current application of MRE is for diagnosing hepatic fibrosis. Chronic liver disease is serious worldwide problem, and hepatic fibrosis is the most important consequence, which if not detected and treated, eventually leads to cirrhosis which is irreversible and associated with high mortality. MRE can be readily implemented on a standard MRI system. A device is used to generate vibrrations in tissue. The waves are imaged with a special MRI pulse sequence. Acquistion time for liver MRE is approximately 15 seconds. Because the incremental imaging time is so small, MRE can readily added to standard abdominal MR imaging protocols. The data are automatically processed generate quantitative images showing the elasticity of the liver and other tissues in the upper abdomen. Clinical studies by multiple investigators have now established that MRE is an accurate method for diagnosing hepatic fibrosis. MRE-measured hepatic stiffness increases systematically with fibrosis stage. Growing clinical experience indicates that MRE is at least as accurate as liver biopsy for this diagnosis, while also being safer, more comfortable, and less expensive. Human studies have demonstrated that it is feasible to apply MRE to quantitatively assess other tissues and organs such as brain, breast, heart, and kidney. MRE may be helpful in differentiating between benign and malignant neoplasms. New research has shown that MRE is helpful in the preoperative assessment of patients with brain tumors such as menigiomas.

RC718

Imaging Tumor Response: Old and New Challenges

Thursday, Dec. 3 4:30PM - 6:00PM Location: S102AB

BQ MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC718A Reporting Cancer Response-Practical Perspective

Participants
Elena K. Korngold, MD, Portland, OR (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Define important terms and concepts in tumor response assessment. Describe the current use of imaging for evaluating response of GI cancers. 2) Understand the rationale for the creation of standardized and structured criteria for imaging evaluation of tumor response to therapy in research trials. 3) Understand the basic concept and organization of the RECIST (Response Evaluation Criteria in Solid Tumors) criteria. Understand the limitations of RECIST and other standardized reporting methods. 4) Recognize the reason for use of alternate criteria in specific diseases (i.e., Cheson for lymphoma, EASL/mRECIST for HCC), biomarkers, and the evolving role of imaging in evaluation of tumor response with novel therapeutic interventions.

RC718B Prostate Cancer Treatment Assessment

Participants
Hedvig Hricak, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the clinical challenges of prostate cancer post-treatment follow-up and the role of imaging in detecting local recurrence. 2) Know how MRI protocols for detecting local recurrence should be adjusted depending on the prior treatment and the questions being asked. 3) Understand standard and emerging uses of bone scanning, PET/CT and MRI/PET for detecting metastasis.

ABSTRACT

MRI has emerged as the key modality for assessing local recurrence of prostate cancer after radical prostatectomy (RP) or radiation therapy (RT). Early detection of local recurrence is important to allow potentially curative salvage therapy. The efficacy of MRI in detecting local recurrence is treatment dependent, and MRI protocols need to be adjusted to the questions being asked. After RT, T2-weighted MRI is limited due to post-radiation effects on the prostate such as glandular shrinkage, loss of normal zonal anatomy, and reduced contrast between cancer and normal tissue caused by glandular atrophy and fibrosis. MRI should include both T2-weighted and diffusion-weighted sequences; a recent study suggested that in most patients, dynamic contrast-enhanced (DCE)-MRI could be omitted after RT without lowering diagnostic performance, thereby eliminating the risks and costs associated with the use of contrast. If salvage treatment is an option after RT, MRI offers loco-regional staging. Post-RT MRI can evaluate the length of the urethra and may show urethral shortening (which has been associated with incontinence after primary RP), decreased urethral margin definition and other tissue changes that could conceivably affect treatment selection and planning. After surgery, in addition to DWI, the use of DCE-MRI is essential, as it can show small lesions and differentiate tumor from scarring. MRI may help to determine whether post-RP local recurrence is amenable to salvage RT and may aid RT planning. Assessment of recurrence after emerging focal therapies remains problematic, since methods for reliably differentiating necrosis or scarring from tumor are lacking. In the future, PET/CT with targeted tracers may be able to address this need. PET/CT and bone scanning are valuable in the search for nodal and osseous metastases, respectively. The implementation of clinical MRI/PET and the use of new tracers will likely open new horizons in the assessment of recurrence.

RC718C Evaluating Response in Targeted Therapy of Abdominal Malignancy

Participants
Yves M. Menu, MD, Paris, France (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the main challenges in abdominal tumors treated with targeted chemotherapies in clinical situations like neoadjuvant therapy, tumor down staging or palliative treatment. 2) Know the specific situations of most common abdominal malignancies like liver primary and secondary tumors, pancreatic adenocarcinoma and colorectal cancer. 3) Understand how the Radiologist should manage the imaging techniques (CT, MRI, PET) in order to meet the clinical objectives and if targeted therapies require changes over cytotoxic chemotherapies.

ABSTRACT

Abdominal malignancies are very common. Imaging is pivotal for detection, staging and evaluation of tumor response to treatment. As targeted therapies are increasingly administered, the necessity for an update of tumor response criteria has become obvious. Tumor size and anatomy is still required important information, but evaluation of tissue viability is increasingly needed. Another specificity of abdominal malignancies is the increasing number of patients who are candidates for an integrated approach including systemic therapies, local therapies, radiation therapy and surgery. This underlines the necessity of a team approach and the major role of the radiologist within this group.In Hepatocellular Carcinoma (HCC), targeted therapies are widely used and mainly aimed at palliation, although potential downstaging may lead to reconsider this position. mRECIST criteria have been developed specifically

for HCC and are considered as the international standard nowadays.In secondary liver tumors, targeted therapies are usually administered in association with cytotoxic drugs. As up to 30% of patients with liver metastases from colon cancer might become resectable, the evaluation is not limited to volumetric response. The report should mention in addition relevant information on tumor viability and aggressiveness and also comment on useful elements for guidance of potential surgery or intervention.In other abdominal advanced malignancies, targeted therapies are not yet standard. However, due to the poor prognosis of these diseases, very active research develops in this field and interestingly favors a better selection of patients. Imaging may play a role with this issue, like classifying locally advanced vs metastatic patients as well as highly vs less agressive tumors.In summary, the Radiologist should have knowledge of the main clinical challenges, of ongoing and potential treatments in order to provide relevant information to the Multi Disciplinary Team.

RC718D Evaluation of Lung Cancer Response

Participants
Jeremy J. Erasmus, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the applicability of anatomic imaging using World Health Organization (WHO) criteria and Response Evaluation Criteria in Solid Tumors (RECIST 1.1) in the assessment of tumor response in patients with non-small cell lung cancer (NSCLC). 2) To be aware of the limitations of World Health Organization (WHO) criteria and Response Evaluation Criteria in Solid Tumors (RECIST 1.1) in the assessment of tumor response. 3) To understand the potential role of metabolic tumor response assessment with 18F-FDG PET (PET Response Criteria in Solid Tumors (PERCIST)) in patients with NSCLC.

ABSTRACT

NSCLC commonly presents with advanced disease and chemotherapy is often an integral component in;treatment. However, following initiation of chemotherapy, tumor progression can occur in up to 33% of patients. Early determination of this therapeutic failure can be important in management and can assist clinical decisions concerning discontinuation of ineffective treatment and institution of alternative therapy. Additionally, an essential component of evaluating the results of cancer treatment in patients on clinical trials is the reporting of the response rate. Because small differences in the response rate can affect the outcome clinical trials, it is important that the criteria used to make this determination are meaningful and consistent. While the antitumor effect of a treatment in patients with solid tumors can be determined clinically or by surgical pathologic re-staging, image-based serial measurements based on WHO criteria or Response Evaluation Criteria in Solid Tumors (RECIST) provide uniform criteria for reporting response. However, morphological alterations detected by CT may not correlate with pathological response and tumor viability. Furthermore, the assessment of objective response has also been complicated by the development of treatment protocols that target tumor biology including tumor cell proliferation and invasion, angiogenesis and metastasis. Anti-tumor effect in many of these regimens is cytostatic and, unlike anticancer cytotoxic agents, may not cause regression in tumor size. FDG-PET may allow an early and sensitive assessment of the effectiveness of anticancer chemotherapy as FDG uptake is not only a function of proliferative activity but is also related to viable tumor cell number. This talk will review the status and limitations of anatomic and metabolic tumor response metrics in NSCLC including WHO criteria, RECIST 1.1 and PET Response Criteria in Solid Tumors (PERCIST).

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Jeremy J. Erasmus, MD - 2015 Honored Educator

RC721

Medical Physics 2.0: Information Management and Display

Thursday, Dec. 3 4:30PM - 6:00PM Location: E353A

PH IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ehsan Samei, PhD, Durham, NC (*Director*) Nothing to Disclose
Douglas E. Pfeiffer, MS, Boulder, CO (*Director*) Nothing to Disclose

Sub-Events

RC721A Information Management and Display Perspective

Participants
Ehsan Samei, PhD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To gain an appreciation for interaction between medical physics and information technology in modern medicine 2) To understand how physics can add value to patient care in the area of information and image management and technology.

RC721B Information Management and Display 1.0

Participants
Donald Peck, PhD, Detroit, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the different areas of imaging informatics. 2) Understand the methodology for developing informatics standards and their current status. 3) Understand the components of various informatics systems. a. Enhanced DICOM objects. b. Vender neutral archives for enterprise image storage. c. Web distribution protocols. d. Dose monitoring. e. Reporting systems. f. Structured reports.

ABSTRACT

Imaging informatics is part of every radiology practice today. Imaging informatics covers everything from the ordering of a study, through the data acquisition and processing, display and archiving, reporting of findings and the billing for the services performed. The standardization of the processes used to manage the information and methodologies to integrate these standards is being developed and advanced continuously. These developments are done in an open forum and imaging organizations and professionals all have a part in the process. In this presentation the flow of information and the integration of the standards used in the processes will be reviewed. The role of radiologists and physicists in the process will be discussed. Current methods for validation of informatics systems function will also be discussed.

RC721C Information Management and Display 2.0

Participants
Michael J. Flynn, PhD, Detroit, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the display performance evaluation methods used for monitor QA. 2) Understand current guidelines for display systems that are used for medical imaging. 3) Learn about emerging requirements for handheld display, and color display.

RC722

Personalized Medicine: Abdomen

Thursday, Dec. 3 4:30PM - 6:00PM Location: S404CD

GI RO PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Kristy K. Brock, PhD, Ann Arbor, MI (*Moderator*) License agreement, RaySearch Laboratories AB;

ABSTRACT

The use of imaging and other biomarkers to increase the efficacy of treatment and decrease the risk of toxicity increased in the abdomen. Functional imaging and serum-based biomarkers can enable a more detailed understanding of the tumor, its characteristics, and early indications of its response to therapy. In addition, they can also be utilized to assess an individual patients risk for toxicity, enabling a personalize approach to radiotherapy. These advanced imaging techniques can be combined with anatomical information to generate high precision treatment plans which can be adapted over the course of treatment to account for identified uncertainties, changes, and deviations which may compromise the delivery of the intended treatment or identify the ability to re-optimize treatment to improve the therapeutic ration. In this session, technical and clinical concepts will be described to design and deliver personalized radiotherapy in the abdomen. Technical concepts will include incorporation of multi-modality imaging for treatment planning, image guidance at treatment, and functional and anatomical adaption. Clinical concepts will include functional targeting, clinical goals, and toxicity risks.

Sub-Events

RC722A IGRT and Anatomical Adaptation

Participants
Kristy K. Brock, PhD, Ann Arbor, MI, (kkbrock@med.umich.edu) (*Presenter*) License agreement, RaySearch Laboratories AB;

LEARNING OBJECTIVES

1) Describe the processes necessary for the safe and accurate integration of multi-modality imaging for treatment planning. 2) Understand the role of image guidance for abdominal radiotherapy. 3) Illustrate methods to perform functional and anatomical adaptation in the abdomen.

ABSTRACT

The use of imaging and other biomarkers to increase the efficacy of treatment and decrease the risk of toxicity increased in the abdomen. Functional imaging and serum-based biomarkers can enable a more detailed understanding of the tumor, its characteristics, and early indications of its response to therapy. In addition, they can also be utilized to assess an individual patients risk for toxicity, enabling a personalize approach to radiotherapy. These advanced imaging techniques can be combined with anatomical information to generate high precision treatment plans which can be adapted over the course of treatment to account for identified uncertainties, changes, and deviations which may compromise the delivery of the intended treatment or identify the ability to re-optimize treatment to improve the therapeutic ration. In this session, technical and clinical concepts will be described to design and deliver personalized radiotherapy in the abdomen. Technical concepts will include incorporation of multi-modality imaging for treatment planning, image guidance at treatment, and functional and anatomical adaption. Clinical concepts will include functional targeting, clinical goals, and toxicity risks.

RC722B Functional Targeting, Clinical Goals, and Toxicity Risks

Participants
Joseph M. Herman, MD, MSc, Baltimore , MD (*Presenter*) Consultant, Merrimack Pharmaceuticals, Inc

LEARNING OBJECTIVES

1) Review methods to obtain, process and analyze tissue and serum based biomarkers for abdominal tumors. 2) Describe current dose/fractionation regimens as well as normal tissue constraints utilized in treating abdominal tumors. 3) Explain potential advantages of assessing treatment response with MRI and quantitative PET/SPECT (PERCIST) imaging over CT based response (RECIST) in abdominal tumors.

ABSTRACT

In order to deliver personalized radiation therapy in abdominal tumors, it is important to understand the methods used to obtain, analyze, and interpret serum and tissue based biomarkers. Most research to date has focused on identifying specific biomarkers used to personalize systemic or targeted therapies. Radiation-specific biomarkers are emerging and may eventually be used to determine whether radiation is indicated or identify specific radiation sensitizers for use in abdominal tumors. Radiation therapy planning has historically used computed tomography (CT)-based imaging. Molecular imaging using hybrid positron emission tomography (PET)/CT scanning or single-photon emission computed tomography (SPECT) imaging and functional magnetic resonance imaging (MRI) has provided new insights into the precise identification of gross tumor volume (GTV) and clinical tumor volume (CTV) and has provided response information during and after therapy. The effective use of PET/SPECT and MRI in clinical practice, however, requires an appreciation of the unique challenges inherent to these modalities. Fundamental physical issues of limited spatial resolution relative to the biological process, partial volume effects, image misregistration, motion management, and edge delineation must be carefully considered and can differ by agent or the method applied. Integration of PET/SPECT and MRI imaging into multicenter clinical trials and clinical practice can be particularly challenging due to differences in imaging protocols, machines, and anatomy. Imaging protocols that clearly outline scan and fusion parameters are crucial. Further, interpretation of tumor response should be standardized, and scans should be obtained at consistent time intervals. In addition, it is important to consider novel tracers of tumor biology (e.g. hypoxia, proliferation, apoptosis) beyond the commonly used radiotracers. In this

session, we will discuss these applications and challenges as well as provide guidance on how to integrate PET/SPECT/MRI into radiation treatment planning and assessing treatment response. Finally, we will evaluate common dose and fractionation regimens as well as established dose constraints used in treating abdominal tumors with conventional and stereotactic body radiation therapy.-

RC723

MR Safety II

Thursday, Dec. 3 4:30PM - 6:00PM Location: E352

MR PH SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Matthew A. Bernstein, PhD, Rochester, MN (*Director*) Research collaboration, General Electric Company

LEARNING OBJECTIVES

1) Classify MR conditional pacemakers, and describe guidelines for their clinical usage in the MR environment. 2) List several MR Safety incidents and describe their root causes. 3) Describe special MR Safety hazards present in the interventional MR environment, and identify countermeasures to reduce the associated risks. 4) Implement preventive measures for MR Safety in a clinical practice to improve the standard of care.

ABSTRACT

Sub-Events

RC723A MRI Conditional Pacemakers, What to Do?

Participants
Anshuman Panda, PhD, Phoenix, AZ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC723B Case Review of Real MR Safety Incidents

Participants
Armen Kocharian, PhD, Houston, TX, (akocharian@houstonmethodist.org) (*Presenter*) Research collaboration, General Electric Company

LEARNING OBJECTIVES

View learning objectives under main course title.

Active Handout:Armen Kocharian

http://abstract.rsna.org/uploads/2015/15002852/RC723B Case Review of Real MR Safety Incidents (1).pdf

RC723C MRI Safety in the MR-Guided Interventional Environment

Participants
Krzysztof Gorny, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC724

Near Misses and Errors in Diagnostic Radiology and Radiation Oncology: What to Do Next?

Thursday, Dec. 3 4:30PM - 6:00PM Location: S403B

RO PH SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Mahadevappa Mahesh, MS, PhD, Baltimore, MD (*Moderator*) Author with royalties, Wolters Kluwer nv

ABSTRACT

Radiation incidents in diagnostic radiology and radiation oncology is never a favorite item for anyone. Many a times, a single error or miss may lead to devastating result and can shine media spotlight. The purpose of this refresher course is to address this issue from various skate-holders. The course includes a tag-team of physicians-physicists addressing what one needs to next after a radiation incident occurs. The main objective of this refresher course is to provide ways audience can implement in their settings to address such events.

Sub-Events

RC724A Radiation Incidents in Diagnostic Radiology: What Does the Physicist Do Next?

Participants
Mahadevappa Mahesh, MS, PhD, Baltimore, MD, (mmahesh@jhmi.edu) (*Presenter*) Author with royalties, Wolters Kluwer nv

LEARNING OBJECTIVES

1) To examine settings to ensure radiation incidents do not occur. 2) To develop plan of action for post radiation incident evaluation. 3) To reflect on processes such as quality control, training etc.

ABSTRACT

Even though radiation incidents in diagnostic radiology may not be as life threatening as in radiation oncology, yet it is equally important to devise plans of action to address radiation incidents in diagnostic radiology. This talk will discuss various measures medical physicists can do to address such situations.Defining radiation incidents in diagnostic imaging settings are key. Radiation incidents can lead to deterministic effects such as hair-loss or skin erythema, which are rare but possible due to prolonged fluoroscopy procedures or CT scans (CT perfusion studies) due to incorrect settings. Even though prevention is better and is achievable by routine review of equipment and protocol settings, but when radiation incidents occur, a physicist can do the following. First, physicist should record details of scan settings that have led to the radiation incident. Next, it is important to assess and make necessary changes to the scan settings to avoid future incidents. This should be followed by detail assessment of radiation exposure to patients (skin dose and organ dose) and work with the radiologists and other physicians to address the radiation events. In addition, tasks including regulatory compliance, staff training, and others will be discussed in this talk.

RC724B Radiation Incidents in Radiation Oncology: What Does the Physicist Do Next?

Participants
Eric Ford, PhD, Seattle, WA, (eford@uw.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Appreciate the systems-based approach to addressing the underlying causes of incidents. 2) Understand the medical physicist's specific role in this. 3) Gain familiarity with emerging error reduction tools in radiation oncology.

ABSTRACT

Incidents in healthcare are a symptom of an underlying condition. In order to improve the quality and safety of care one must address these underlying conditions and not just the particulars of an incident itself. What is the physicist's role in this? In its simplest form, the medical physicist in radiation oncology performs quality assurance tests and commissioning procedures to ensure that the next incident does not happen. These tasks are often prescriptive in nature. As a quality management expert, though, the medical physicist's contribution extends far beyond these routine duties into the realm of understanding and controlling clinical process at the broadest level. There is an array of emerging tools from the AAPM and elsewhere that enable this. It is now possible, for example, to characterize and quantify the risks associated with clinical processes. It is also possible to benchmark performance in safety-critical area against other clinics. And it is possible to participate in incident investigation and learning through the newly released national incident learning system. All of these activities are core competencies of a medical physicist in radiation oncology in the modern era. By leading and participating in such efforts the medical physicist has a direct impact on improving the quality and safety of care.

RC724C Radiation Incidents in Diagnostic Radiology: What Does the Diagnostic Radiologist Do Next?

Participants
Kimberly E. Applegate, MD, MS, Zionsville, IN, (keapple@emory.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe common incidents and their root cause in diagnostic radiology departments where patients are exposed to unintended radiation doses. 2) Understand both qualitative and quantitative metrics in a radiology safety program. 3) Provide examples of quality assurance and improvement projects based on a safety event and that promote a culture of safety.

ABSTRACT

Safety is necessary but not sufficient to ensure quality healthcare. Radiology departments and healthcare systems must be in alignment with their programs on safety culture, policies, and practice to best minimize patient harm. When events happen-and they will-it is critical to understand how to disclose them, how to learn from them, and how to improve processes so that future patients in the system may not be harmed. Further, it is important that the culture of the radiology department embraces learning from near misses that provide the opportunity to improve practice before a patient is harmed. This lecture will share stories that led to quality improvement projects.

RC724D Radiation Incidents in Radiation Oncology: What Does the Radiation Oncologist Do Next?

Participants
Naomi R. Schechter, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe strategies for responding to variety of potential near misses and errors in radiation oncology department as pertains to individual patient care. 2) Describe strategies for learning from near misses and errors in radiation oncology department for purpose of quality improvement and prevention of future errors.

ABSTRACT

In a radiation oncology department, incidents can range from minor to severe. We take them all seriously. Due to our many checks and balances, it is unusual for an error to reach the patient. In the rare case that an error does reach the patient, most can be corrected for, with minimal if any harm to the patient. Our goal is to learn from every incident, review our processes and continually improve the delivery of radiation therapy to prevent future errors from occurring.

RC725

Radiomics Mini-Course: From Image to Radiomics

Thursday, Dec. 3 4:30PM - 6:00PM Location: S404AB

BQ PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Sandy Napel, PhD, Stanford, CA (*Director*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc

Sub-Events

RC725A Image Annotation and Semantic Labeling

Participants
Daniel L. Rubin, MD, MS, Palo Alto, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the new Big Data paradigm in Radiology and learn about new tools that can help Radiologists to leverage images more effectively. 2) To become acquainted with the Annotation and Image Markup (AIM) format that makes image metadata (radiologist observations and quantitative image features) machine-accessible. 3) To learn how AIM can support radiology clinical workflow, enable research discovery, support regulatory objectives, facilitate new biomarker development, and improve clinical practice.

ABSTRACT

The Annotation and Image Markup (AIM) format for collecting and storing measurements and other information in images brings tremendous benefits to clinical radiology. AIM standardizes iamge annotations, making the semantic descriptors and quantitative information in images machine-accessible, searchable, and minable. AIM allows more specific and customizable searching of annotations, enabling objective and computable analysis of measurements, and helps clinicians to more easily leverage images in a variety of application such as automated reporting, report summaries, lesion tracking, content based image retrieval, and decision support. AIM also enables trials that collect image measurements, and it facilitates integrating image data with non-image data, such as molecular and clinical data. Finally, by standardizing measurement data and permitting aggregating image annotations across multiple sites, AIM will allow for new imaging biomarker discovery and validation that might lead to better response criteria for use both clinically and in the approval of new medical products. AIM currently underlies an interconnected suite of tools that allows researchers to easily generate minable structured image metadata for research, and it is being used in several national projects and at a variety of institutions nationally.URLs:(a) https://wiki.nci.nih.gov/display/AIM/Annotation+and+Image+Markup+-+AIM(b) http://epad.stanford.edu

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Daniel L. Rubin, MD, MS - 2012 Honored Educator
Daniel L. Rubin, MD, MS - 2013 Honored Educator

RC725B Image Feature Computation and Considerations

Participants
Sandy Napel, PhD, Stanford, CA (*Presenter*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc

LEARNING OBJECTIVES

1) Learn about processing pipelines that extract features from regions within images. 2) Learn about different classes of features. 3) Learn about feature interactions and influence of segmentation.

ABSTRACT

Images can be two-dimensional (2D), 3D, time varying, and/or vector valued (when, e.g., multiple acquisitions of the same volume are acquired). Computation of features from images requires delineation (also called segmentation) of regions or volumes within these multidimensional images, and then applying computer algorithms to the data within these regions to characterize them and, perhaps, their surroundings, with numbers. This session will cover the structure of feature computation pipelines and various factors that influence their outputs. Classes of features include shape (values characterize region boundary smoothness and compactness), margin (values characterize how sharp the transition is from inside to outside the region), and texture (variation of gray values or color within and possibly nearby to the region). In addition, specialized features may be computed when prior research has described important implications of observations (e.g., %-ground glass opacities in lung nodules at CT). It is important to recognize that computed features may be influenced by data acquisition and reconstruction methods (e.g., sharp vs. smooth reconstruction kernels in CT, contrast agent on board, variation in pulse sequences across vendors), aspects of the region they are not designed to characterize (e.g., shape influenced by texture causing segmentation irregularities, histogram statistics influenced by nearby structures (e.g., bone within the segmentation of a lung nodule near a rib). Attention to these details can result in improved utility of extracted features, and more significance in associations of features with other clinical variables.

RC725C Correlating Image Features with Multi-Omics Data

Participants
Olivier Gevaert, PhD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how to model the relationship between image features and genomic data using univariate and multivariate methods.
2) Implement dediciated preprocessing for image feature data and for genomic data, each requiring their own statistical modeling.

ABSTRACT

Vast amounts of molecular data characterizing the genome, epi-genome and transcriptome are becoming available for a wide range of cancers. In addition, new computational tools for quantitatively analyzing medical and pathological images are creating new types of phenotypic data. Now we have the opportunity to integrate the data at molecular and tissue scale to create a more comprehensive view of key biological processes underlying cancer. Moreover, this integration can have profound contributions toward predicting diagnosis and treatment. I will discuss current work in progress to model multi-omics data and how to integrate it with medical imaging data. I will show examples for non-small cell lung cancer and glioblastoma.

RC727

The Future of Radiology Payments: Can Analytics Help Radiologists Regain Control?

Thursday, Dec. 3 4:30PM - 6:00PM Location: N226

HP

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
David A. Rosman, MD, Boston, MA (*Coordinator*) Nothing to Disclose
David A. Rosman, MD, Boston, MA (*Moderator*) Nothing to Disclose
Danny Hughes, PhD, Reston, VA, (dhughes@neimanhpi.org) (*Presenter*) Nothing to Disclose
Woojin Kim, MD, Philadelphia, PA, (woojinrad@gmail.com) (*Presenter*) Co-founder, Montage Healthcare Solutions, Inc; Shareholder, Montage Healthcare Solutions, Inc; Board of Directors, Montage Healthcare Solutions, Inc; Advisory Board, Zebra Medical Vision Ltd

LEARNING OBJECTIVES

1) Understand how analytics can help radiologists provide value over volume and get compensated for it. 2) Understand how big data and analytics can be made accessible to the practicing radiologist. 3) Better understand radiology's place in the economic puzzle of bundles. 4) Understand how analytics can make the radiologists report more accurate and easier to produce. 5) Understand how a department powered by analytics can enhance quality and payment.

ABSTRACT

As healthcare delivery models evolve into ones that reward value over volume, the mechanisms by which physicians and facilities will be compensated will change. To date, there is little consensus on how radiologists and radiology departments will be addressed under new payment models. This program is intended for radiologists at all stages of their careers and in various leadership and management roles, and is intended to demonstrate the power of historical analytic data in forming the baseline for innovative local and national payment models that will align stakeholder interests. It is also aimed at the more day to day practical side of analytics explaining how they can help create more consistent and accurate reports while simultaneously enhancing payment. Increasingly, practice leaders will be required to establish contracts based on risk and value. Given the seeming lack of information regarding new payment models and how they are actually implemented, it is easy for radiologists to feel hopeless or powerless against the oncoming tide of change. This program will show that, using data and analytics, radiology and radiologists can regain control of their financial stake in the patient encounter. Although "Big Data" and "Analytics" may sound like something that cannot affect your day to day practice as a radiologists, it turns out that having powerful tools work in the background can allow for better, more consistent reports, better communication of critical results and followup and can allow for a more proactive rather than reactive radiology practice.

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Woojin Kim, MD - 2012 Honored Educator

RC729

Updates in Pancreatic Imaging: Spotlight on MRI (An Interactive Session)

Thursday, Dec. 3 4:30PM - 6:00PM Location: E451A

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC729A Systematic Approach to Pancreatic Cancer

Participants
Elizabeth M. Hecht, MD, New York, NY, (eh2560@cumc.columbia.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss a systematic approach to diagnosing and staging pancreatic cancer and discuss template reporting for preoperative planning. 2) Discuss potential mimics and pitfalls related to diagnosis and staging of solid pancreatic neoplasms

ABSTRACT

Treatment of pancreas cancer requires a multidisciplinary approach. Imaging interpretation and reports play a critical role in managing patients with pancreatic pathology. Accurate staging of pancreatic neoplasms is paramount to determining management and imaging plays a central role in stratifying patients for treatment. The goal of surgery is to achieve resection margins free of tumor to maximize survival benefit. Unnecessary surgery and accompanying morbidity need be minimized in patients with no added survival benefit from resection. Structured reporting and standardized terminology enhances communication with the clinic team and imparts key elements into a diagnostic report that will help determine appropriate management.

Active Handout:Elizabeth M. Hecht

http://abstract.rsna.org/uploads/2015/15002793/Active RC729A.pdf

RC729B Pancreatic Cyst: A Multidisciplinary Approach to Diagnosis and Management

Participants
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the imaging features of pancreatic cysts and the impact of multidisciplinary approach to diagnosis and management.

ABSTRACT

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Ihab R. Kamel, MD, PhD - 2015 Honored Educator

RC729C The Inflamed Pancreas: Pearls and Perils

Participants
Koenraad J. Mortele, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the imaging features of a vast array of inflammatory conditions that may involve the pancreas.

RC731

Common Spinal Injection Procedures for Diagnosis and Treatment of Back Pain (Hands-on)

Thursday, Dec. 3 4:30PM - 6:00PM Location: E263

MK NR IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
A. Orlando Ortiz, MD, MBA, Mineola, NY (*Presenter*) Nothing to Disclose
Bassem A. Georgy, MD, MSc, San Diego, CA (*Presenter*) Consultant, Johnson & Johnson; Consultant, DFINE, Inc; Stockholder, DFINE, Inc ; Stockholder, Spine Solutions, Inc; ;
Allan L. Brook, MD, Bronx, NY (*Presenter*) Advisor, Johnson & Johnson Advisor, Medtronic, Inc
Afshin Gangi, MD, PhD, Strasbourg, France (*Presenter*) Nothing to Disclose
Todd S. Miller, MD, Bronx, NY, (Tmiller@montefiore.org) (*Presenter*) Nothing to Disclose
Stanley Golovac, MD, Merritt Island, FL (*Presenter*) Consultant, St. Jude Medical, Inc; Investigator, Vertos Medical Inc; Investigator, St. Jude Medical, Inc

LEARNING OBJECTIVES

1) Describe and demonstrate methods for patient selection, evaluation and technique for Image-guided injection procedures used in spine pain management. 2) These procedures will include epidural steroid injections, nerve root blocks, facet blocks, sacroiliac joint injections, lumbar synovial cyst therapy, radiofrequency ablations. 3) Review procedural complications and how to avoid them. 4) Discuss pertinent anatomy, instruments and pharmacology. 5) These objectives will be accomplished using didactic lectures complemented by procedure videos, supervised hands on lab work with training models and round table case discussions.

ABSTRACT

Neck and back pain complaints are very common in the general population. Radiologists can contribute to the diagnosis and management in patients who are not responding to conservative management. Spine injection procedures can frequently be performed on an outpatient basis with a brief recovery phase. These procedures are performed with imaging guidance, such as a multi-directional fluoroscope or under CT guidance, in order to correctly localize the specifice anatomic sites in or about the spine for diagnostic and or therapecutic needle localization. An understanding of patient selection, indications and contraindications, are paramount to the safety and success of these procedures. The diagnostic and therapeutic potential of these procedures is also facilitated by a thorough evaluation of the spine, with respect to both anatomy and potential pathology, with cross sectional imaging techniques as well as other radiologic tests. Communication of these results between the Radiologist and the spine proceduralist will contribute to optimal patient outcomes.

Handout:Afshin Gangi

http://abstract.rsna.org/uploads/2015/3010360/lumbar inj.pptx

Active Handout:Todd Stuart Miller

http://abstract.rsna.org/uploads/2015/3010360/RC731 MBB Facets MILLER.pptx.pdf

RC732

Medical-Legal Hot Topics for Radiologists

Thursday, Dec. 3 4:30PM - 6:00PM Location: S502AB

LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

1) Understand the importance of ensuring communication of critical radiology results. 2) Consider common reasons for perceptual errors in body imaging. 3) Familiarize themselves with some key risk management take home points in radiology.

Sub-Events

RC732A Communication - An Essential Strategy for Risk Management

Participants
Leonard Berlin, MD, Skokie, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC732B Selected Topics in Radiology Risk Management: Errors and Communication 2015

Participants
Jonathan W. Berlin, MD, Evanston, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC750

MR Imaging-guided Breast Biopsy (Hands-on)

Thursday, Dec. 3 4:30PM - 6:00PM Location: E260

BR MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Peter R. Eby, MD, Seattle, WA, (peter.eby@virginiamason.org) (*Moderator*) Consultant, Devicor Medical Products, Inc
Beatriz E. Adrada, MD, Houston, TX (*Presenter*) Nothing to Disclose
Sandra Brennan, MBBCh, MSc, West Harrison, NY (*Presenter*) Nothing to Disclose
Selin Carkaci, MD, Columbus, OH (*Presenter*) Author with royalties, Reed Elsevier
Chloe M. Chhor, MD, New York, NY (*Presenter*) Nothing to Disclose
Mark J. Dryden, MD, Houston, TX (*Presenter*) Nothing to Disclose
Sujata V. Ghate, MD, Durham, NC (*Presenter*) Nothing to Disclose
Vilert A. Loving, MD, Gilbert, AZ, (vloving@mdanderson.org) (*Presenter*) Nothing to Disclose
Michelle D. McDonough, MD, Jacksonville, FL, (McDonough.michelle@mayo.edu) (*Presenter*) Nothing to Disclose
Virginia M. Molleran, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose
Habib Rahbar, MD, Seattle, WA (*Presenter*) Research grant, GE Healthcare
Jean M. Seely, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Stephen J. Seiler, MD, Dallas, TX, (stephen.seiler@utsouthwestern.edu) (*Presenter*) Nothing to Disclose
Laura B. Shepardson, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Tanya W. Moseley, MD, Houston, TX (*Presenter*) Nothing to Disclose
Roberta M. Strigel, MD, MS, Madison, WI, (rstrigel@uwhealth.org) (*Presenter*) Research support, General Electric Company
Janice S. Sung, MD, New York, NY (*Presenter*) Nothing to Disclose
Lilian Wang, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Annamaria Wilhelm, MD, Jacksonville, FL (*Presenter*) Nothing to Disclose
Simone Schrading, MD, Aachen, Germany (*Presenter*) Nothing to Disclose
Bethany L. Niell, MD, Boston, MA (*Presenter*) Nothing to Disclose
Jocelyn A. Rapelyea, MD, Washington, DC (*Presenter*) Consultant, General Electric Company

LEARNING OBJECTIVES

1) Explain why MR-guided breast biopsy is needed for patient care. 2) Identify relative and absolute contraindications to MR-guided breast biopsy. 3) Describe criteria for MR-guided breast biopsy patient selection. 4) Debate risks and benefits of pre-biopsy targeted ultrasound for suspicious MRI findings. 5) Understand basic MR-guided biopsy parameters and requirements for appropriate coil, needle and approach selection. 6) Manage patients before, during and after MR-guided breast biopsy. 7) Define benefits and limitations of MR-guided vacuum assisted breast biopsy. 8) Apply positioning techniques to challenging combinations of lesion location and patient anatomy for successful MR-guided biopsy.

ABSTRACT

This course is intended to provide basic didactic instruction and hands-on experience for MR-guided breast biopsy. Because of the established role of breast MRI in the evaluation of breast cancer through screening and staging, there is a proven need for MR-guided biopsy of the abnormalities that can only be identified at MRI. This course will be devoted to the understanding and identification of: 1) appropriate patient selection 2) optimal positioning for biopsy 3) target selection and confirmation 4) various biopsy technologies and techniques 5) potential problems and pitfalls and 6) practice audits. Participants will spend 30 minutes in didactic instruction followed by 60 minutes practicing MR-guided biopsy using provided phantoms. Various combinations of full size state-of-the-art breast MRI coils, biopsy localization equipment and needles from multiple different vendors will be available for hands-on practice. Some stations will have monitors loaded with targeting software. Expert breast imagers from around the world will be at each of 10 stations to provide live coaching, tips, techniques and advice.

Active Handout:Peter R. Eby

http://abstract.rsna.org/uploads/2015/6005779/RC750.pdf

RC751

Pitfalls in Liver Imaging

Thursday, Dec. 3 4:30PM - 6:00PM Location: E451B

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

1) Describe most commonly encountered imaging pitfalls of the liver. 2) Describe relevant technical background. pathophysiology and hemodynamics of these pitfalls. 3) List tips to avoid erroneous diagnosis and clues to reach correct diagnosis.

ABSTRACT

There is a wide range of common pitfalls in liver imaging, which can lead to frequent incorrect diagnoses mainly because many radiologists are not completely familiar with anatomical, morphological, physiological, hemodynamic and biological principles as well as deficiency of modern clinical and radiological knowledge. This leads to common misinterpretations which would further results in wrong management with potentially negative outcome. In this course, we discuss a spectrum of these pitfalls according to the following organization:In this course, we discuss a spectrum of these pitfalls which can be classified to: 1. Diagnostic pitfalls a. Mistaking benign lesions for malignant lesions b. Mistaking malignant lesions for benign lesions2. Technical pitfalls a. CT, US, MR specific issues that create difficulties in diagnosis b. Technique pitfalls 3. Organizing pitfalls by liver status a. Pitfalls in imaging chronic liver disease (cirrhosis) b. Pitfalls in noncirrhotic liver 4. Atypical presentations of common benign lesions 5. Atypical presentations of common malignant lesions 6. Organization according to imaging findings

URL

Sub-Events

RC751A Pitfalls in Liver Imaging

Participants
Khaled M. Elsayes, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Khaled M. Elsayes, MD - 2014 Honored Educator

RC751B Pitfalls in Liver Imaging: Cirrhosis

Participants
Richard L. Baron, MD, Chicago, IL, (rbaron@uchicago.edu) (*Presenter*) Speakers Bureau, Bracco Group

LEARNING OBJECTIVES

View learning objectives under main course title.

RC751C Pitfalls in MR of the Liver: Technique and Contrast Agents

Participants
Janio Szklaruk, MD, PhD, Bala Cynwyd, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC752

Real-time Interventional US (Hands-on)

Thursday, Dec. 3 4:30PM - 6:00PM Location: E264

US IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Christopher A. Molvar, MD, Maywood, IL (*Moderator*) Nothing to Disclose
Kent T. Sato, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Albert A. Nemcek JR, MD, Chicago, IL (*Presenter*) Consultant, B. Braun Melsungen AG
Robert J. Lewandowski, MD, Chicago, IL, (r-lewandowski@northwestern.edu) (*Presenter*) Advisory Board, BTG International Ltd; Advisory Board, Boston Scientific Corporation; Consultant, Cook Group Incorporated; Consultant, ABK Medical Inc
Ramona Gupta, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Terry D. Wilkin, MD, South Bend, IN (*Presenter*) Nothing to Disclose
Kevin L. Keele, MD, Harvey, IL (*Presenter*) Nothing to Disclose
Michael H. Hamblin, MD, Evanston, IL (*Presenter*) Nothing to Disclose
Terence A. Matalon, MD, Philadelphia, PA, (matalont@einstein.edu) (*Presenter*) Speaker, Koninklijke Philips NV
Elias Hohlastos, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Andrew J. Lipnik, MD, Nashville, TN, (andrew.j.lipnik@vanderbilt.edu) (*Presenter*) Nothing to Disclose
Christopher Baron, MD, Nashville, TN (*Presenter*) Nothing to Disclose
Parag M. Amin, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Acquire the skill to direct a needle to a target for diagnostic or therapeutic purposes with Real-time US-guidance.

ABSTRACT

Participants will have the opportunity to hone their skills in ultrasound guided interventions using phantoms. Experienced practitioners in ultrasound guided intervention will serve as faculty.

RC753

Computer Aided Diagnosis (Development and Clinical Applications)

Thursday, Dec. 3 4:30PM - 6:00PM Location: E350

BR CT OI IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Emanuele Neri, MD, Pisa, Italy (*Moderator*) Nothing to Disclose
Hiroyuki Yoshida, PhD, Boston, MA (*Moderator*) Patent holder, Hologic, Inc; Patent holder, MEDIAN Technologies;

LEARNING OBJECTIVES

1) Understand needs of CAD in radiologic image interpretation. 2) Understand basic concept of CAD in assisting radiologists' image reading. 3) Understand the usefulness of CAD in improving radiologists' performance. 4) Learn historical review of CAD developments. 5) Learn CAD for detection and differential diagnosis of common cancers. 6) Learn ROC analysis of radiologists' performance without and with CAD in observer studies.

ABSTRACT

Computer-aided diagnosis (CAD) has become one of the major topics in medical imaging and diagnostic radiology. In this refresher course, the principles of CAD will be presented, together with current developments as well as clinical applications of CAD.CAD aims at improving radiologists' diagnostic accuracy, and it can be used as primary, concurrent, or second reader. In principle, the CAD performs a morphological recognition of the pathology (nodule, focal lesion, polyp, etc.) combined with quantitative information (MR signal intensity, CT density, contrast enhancement, volume, etc.)Many different types of CAD schemes have been developed for detection and/or characterization of various lesions in different imaging modalities, including conventional projection radiography, CT, MRI, and ultrasound imaging. Organs that are subjected to research for CAD include the breast, lung, colon, brain, liver, kidney, and the vascular and skeletal systems.For detection of breast cancer on mammograms, more than 10,000 commercial CAD systems have been used clinically in assisting radiologists worldwide. For detection of lung cancer, CAD schemes have been developed for detection of pulmonary nodules on chest radiographs and CT images. In addition, CAD schemes have been developed for differential diagnosis of distinction between malignant and benign lesions. For colon cancer, CAD schemes have been developed for detection of polyps in CT colonography. Observer performance studies with use of ROC analysis indicated an improved performance in radiologists' task for detection and/or classification of these lesions.

URL

Sub-Events

RC753A Development of a CAD: From Benchtop to Clinic

Participants
Ronald M. Summers, MD, PhD, Bethesda, MD, (rms@nih.gov) (*Presenter*) Royalties, iCAD, Inc; Research funded, iCAD, Inc;

LEARNING OBJECTIVES

1) To understand what radiology problems are amenable to computer aided detection. 2) To understand the steps required to develop and validate a radiology computer-aided detection product. 3) To understand the current performance and future trends in computer-aided detection with respect to indications, algorithms, sensitivity, false positive rates and pitfalls.

ABSTRACT

RC753B CAD for CT Colonography: Where Do We Stand?

Participants
Daniele Regge, MD, Candiolo, Italy, (daniele.regge@ircc.it) (*Presenter*) Speakers Bureau, General Electric Company

LEARNING OBJECTIVES

1) Review interpretation pitfalls of CT colonography that could be overcome with CAD. 2) Present different reading paradigms of CAD for CT colonography and analyze their performances. 3) Summarize advantages and limitations of the use of CAD for CT colonography in different clinical settings.

RC753C CAD for Breast Cancer Detection: Where Do We Stand?

Participants
Ulrich Bick, MD, Berlin, Germany, (Ulrich.Bick@charite.de) (*Presenter*) Equipment support, Hologic, Inc; License agreement, Hologic, Inc; Royalties, Hologic, Inc; Equipment support, Toshiba Corporation; Institutional research collaboration, Siemens AG

LEARNING OBJECTIVES

1) To learn about different applications of computer-aided diagnosis (CAD) in breast imaging. 2) To understand the potential and risks of using CAD in mammography screening. 3) To realize the impact of CAD on soft-copy reading and work-flow

RC753D CAD for Lung Cancer Detection: Where Do We Stand?

Participants
Kunio Doi, PhD, Chicago, IL, (k-doi@uchicago.edu) (*Presenter*) Shareholder, Hologic, Inc; License agreement, Hologic, Inc; License agreement, Deus Technologies, LLC; License agreement, Riverain Technologies, LLC; License agreement, Mitsubishi Corporation; License agreement, MEDIAN Technologies; License agreement, General Electric Company; License agreement, Toshiba Corporation; Research support, Deus Technologies, LLC; Research support, E. I. du Pont de Nemours & Company; Research support, Elcint Medical Imaging Ltd; Research support, FUJIFILM Holdings Corporation; Research support, General Electric Company; Research support, Hitachi, Ltd; Research support, Eastman Kodak Company; Research support, Konica Minolta Group; Research support, Mitaya Manufacturing Co, Ltd; Research support, Mitsubishi Corporation; Research support, Koninklijke Philips NV; Research support, Hologic, Inc; Research support, Riverain Technologies, LLC; Research support, Seiko Corporation; Research support, Siemens AG; Research support, 3M Company; Research support, Toshiba Corporation

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

RC754

Preparing your Radiology Practice and IT Department for Big Data

Thursday, Dec. 3 4:30PM - 6:00PM Location: S105AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Paul J. Chang, MD, Chicago, IL, (pchang@radiology.bsd.uchicago.edu) (*Moderator*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Medical Advisory Board, lifeIMAGE Inc; Medical Advisory Board, Merge Healthcare Incorporated

LEARNING OBJECTIVES

1) The potential of applying "Big Data" approaches to radiology will be discussed. 2) The participant will be introduced to the importance of developing a comprehensive IT architecture and capability beyond the EMR in order to effectively use "Big Data" tools. 3) Strategies for preparing IT for "Big Data" will be discussed.

ABSTRACT

Current and near future requirements and constraints will require radiology practices to continuously improve and demonstrate the value they add to the enterprise. Merely 'managing the practice' will not be sufficient; groups will be required to compete in an environment where the goal will be measurable improvements in efficiency, productivity, quality, and safety. This will require optimally leveraging IT enabled business intelligence, analytics, and data driven workflow. In many ways, this challenge can be described as a "Big Data" problem, requiring the application of newer "Big Data" approaches and tools. Unfortunately, many have discovered that an "EMR centric" IT perspective may severely limit the ability for the enterprise to maximally leverage these newer tools to create differentiable value. This session will provide an introduction to the importance of developing a comprehensive architectural strategy to augment the existing EMR to more effectively consume "Big Data" tools.

Sub-Events

RC754A Getting Your IT Infrastructure Ready for Big Data

Participants
Paul J. Chang, MD, Chicago, IL, (pchang@radiology.bsd.uchicago.edu) (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Medical Advisory Board, lifeIMAGE Inc; Medical Advisory Board, Merge Healthcare Incorporated

RC754B NoSQL Approaches: Beyond the Traditional Relational Database

Participants
Paul J. Chang, MD, Chicago, IL, (pchang@radiology.bsd.uchicago.edu) (*Presenter*) Co-founder, Stentor/Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Medical Advisory Board, lifeIMAGE Inc; Medical Advisory Board, Merge Healthcare Incorporated

LEARNING OBJECTIVES

1) The distinction between the traditional relational (SQL) database and "NoSQL" approaches will be discussed. 2) The attendees will be given a basic introduction to how "NoSQL" tools, such as Hadoop, MapReduce, MongoDB can be complementary to existing approaches. 3) NoSQL applications and their relevance to radiology will be discussed.

ABSTRACT

Current and near future requirements and constraints will require radiology practices to continuously improve and demonstrate the value they add to the enterprise. Merely 'managing the practice' will not be sufficient; groups will be required to compete in an environment where the goal will be measurable improvements in efficiency, productivity, quality, and safety. This will require optimally leveraging IT enabled business intelligence, analytics, and data driven workflow. These approaches will require the ability to consume and utilize all available enterprise data, including unstructured reports, multimedia objects, etc. Other industries have realized that traditional IT approaches, such as the relational (SQL) database, cannot optimally address these "difficult" data objects. Many outside of the medical domain have successfully augmented traditional approaches by newer "Big Data" and "NoSQL" methodologies, such as Hadoop, MapReduce, MongoDB, etc. In this session, an introduction to these newer tools will be presented.

RC754C Deep Learning: An Example of Big Data Applications

Participants
Jeremy Howard, San Francisco, CA (*Presenter*) CEO, Enlitic; Shareholder, Enlitic

LEARNING OBJECTIVES

1) A technical overview of machine learning and deep learning will be presented. 2) Applications of machine learning and deep learning in radiology will be illustrated. 3) Challenges in deploying machine learning and deep learning in radiologist workflow and productivity demands will be discussed.

ABSTRACT

Computers in radiology have often promised to deliver faster clinical decisions, more accurate diagnoses, and transformative visualizations. Computer aided diagnostics (CAD) has been deployed to guide radiologists in their detection of abnormalities and identification of disease. Historically, CAD has been based on domain-driven heuristics, and more recently used simple machine learning on structured data. Both of these require extensive manual engineering making them very slow to build, limited in their flexibility, and less accurate than we would like. Deep learning is a new paradigm that offers a transformative solution. Instead of demanding countless human hours of painstaking feature generation and selection, deep learning automatically discovers clinically-

relevant features by first architecting a hierarchy of patterns (loosely modelled on the brain's own neural neural networks) and then updating those patterns upon observing examples. As radiology requires complex associative pattern recognition, deep learning is the ideal companion tool. Enlitic is developing a deep neural network of the entire human body that will offer a new way forward in which the radiologist has immediate access to the most relevant clinical information. In this talk, we will present a technical overview of machine learning and deep learning, illustrate its applications in radiology, and detail some of the challenges improving radiological workflow using deep learning poses.

RCB55

Making the Most of Google Docs: Docs, Slides, Forms, and Sheets (Hands-on)

Thursday, Dec. 3 4:30PM - 6:00PM Location: S401CD

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Marc D. Kohli, MD, San Francisco, CA (*Moderator*) Research Grant, Siemens AG
Marc D. Kohli, MD, San Francisco, CA (*Presenter*) Research Grant, Siemens AG
Ross W. Filice, MD, Washington, DC, (ross.w.filice@gunet.georgetown.edu) (*Presenter*) Nothing to Disclose
Aaron P. Kamer, MD, Indianapolis, IN (*Presenter*) Nothing to Disclose
Andrew B. Lemmon, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Thomas W. Loehfelm, MD, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the benefits and drawbacks of using Google tools for collaborative editing. 2) Explain issues related to storing protected health information in Google Drive. 3) Demonstrate the ability to use the Google productivity applications for collaboration on document, spreadsheet, online form and presentation creation.

ABSTRACT

Note: Attendees should have or create a Google account prior to coming to the session.In today's busy environment, we need tools to work smarter, not harder. Google's suite of productivity applications provides a platform for collaboration that can be used across and within institutions to produce documents and presentations and to obtain and work-up data with ease. However, with increased sharing, security concerns need to be addressed. At the end of the session, learners should be able to demonstrate creating, sharing, and editing a document as a group.

RCC55

RadLex®: Overview of a New Lexicon for Radiology

Thursday, Dec. 3 4:30PM - 6:00PM Location: S501ABC

IN SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RCC55A Overview of RadLex®

Participants
Kenneth C. Wang, MD, PhD, Ellicott City, MD, (kcwang@gmail.com) (*Presenter*) Co-founder, DexNote, LLC;

LEARNING OBJECTIVES

1) Review the rationale for developing a lexicon for medical imaging. 2) See how an imaging lexicon can be used for education, research, and clinical reporting. 3) Understand the key technical factors in creating a complete and organized vocabulary for medical imaging. 4) Learn about the formats in which RadLex is distributed and the tools that are available for maintaining and using terminology systems. 5) Discover how you can take advantage of RadLex in the development of radiology applications.

ABSTRACT

The purpose of the RadLex lexicon is to provide a uniform framework for indexing and retrieval of a variety of radiology information sources, including teaching files, research data, and radiology reports. The RadLex lexicon unifies radiology terms from other medical lexicons, such as the ACR Index from the American College of Radiology, the Unified Medical Language System (UMLS) from the National Library of Medicine, SNOMED-CT from the College of American Pathology, and the DICOM Content Mapping Resource. This session will explain the motivations for the creation of the RadLex imaging lexicon and describe RadLex-based applications in structured reporting, radiology information retrieval, image annotation, image navigation and decision support. RadLex technical experts will describe the formats in which RadLex is distributed, and will demonstrate some of the tools available to incorporate RadLex into the development of useful software applications. The RadLex Playbook system for standardized radiology procedure names and codes will also be reviewed.

RCC55B 'RadLex Inside': Information Retrieval, Radiology Reporting, and Beyond

Participants
Charles E. Kahn JR, MD, MS, Philadelphia, PA, (charles.kahn@uphs.upenn.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Learn how the RadLex lexicon enables applications in radiology research, education, and clinical practice. 2) Describe how RadLex enables information retrieval. 3) Define the role of RadLex in RSNA's structured reporting initiative. 4) Discover new applications of RadLex in radiology education and decision support.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Charles E. Kahn JR, MD, MS - 2012 Honored Educator

RCC55C ACR Usage of RadLex® Playbook for CT Dose Registry

Participants
Kalpana M. Kanal, PhD, Seattle, WA, (kkanal@uw.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the challenge related to procedure code matching across institutions. 2) Describe the RadLex Playbook. 3) Explain how the RadLex Playbook can be used to harmonize data across institutions.

RC801

Lung Cancer Screening: Structured Reporting, Management and Practice Metrics (LungRADS)

Friday, Dec. 4 8:30AM - 10:00AM Location: E451B

CH CT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Ella A. Kazerooni, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn why structured reporting is important in the practice of lung cancer screening with CT. 2) To learn what the LUNGRADS structured reporting categories are and what management is associated with each category. 3) To understand how to evaluate lung nodules for reporting in the LUNGRADS coding scheme. 4) To learn basic practice audit variables to collect and follow to evaluate a a lung cancer screening CT program.

ABSTRACT

Lung cancer is the leading cause of cancer death in the US for both men and women, exceeding the number of deaths from cancers of the breast, colon, and prostate combined. For each of these cancers, there are well established screening tests. Screening for current and former smokers with LDCT is the only method ever proven to reduce lung cancer mortality in this high risk population and it has also been shown to be cost effective. In December 2013 the USPSTF gave lung cancer screening with CT a grade ;B; recommendation for high risk older current and former smokers. To prepare radiologists to practice lung cancer screening with CT, the ACR Committee on Lung Cancer Screening formed a working group to develop LUNGRADS, which made it#39;s version 1.0;debut in 2014. Similar to BIRADS which is in ;, LUNGRADS provides practicing radiologists with a tool to use for categorizing abnormalities found on lung cancer screening CT exams, with management recommendations for each category. In this course we will review why structured reporting and management is important in lung cancer screening CT. As a public health screening tool, performing the exams with high quality, using standardized reporting and following standard management algorithms is important to minimize overdiagnosis, overutilization of diagnostic testing and interventional procedures ranging from percutaneous biopsy to bronchoscopy and surgery. The LUNGRADS categories try to follow BIRADS approach to coding when possible, recognizing that there are differences in screening for lung cancer and breast cancer. Exams are coded as incomplete (category 0), negative; for clinically active cancer (category 1), benign (category 2), probably benign (category 3) and suspicious (category 4). Additional modifers such as ;S; can be used for clinicially significant or potentially clinically signifiant findings (non lung cancer). Details of using this coding system and metrics to evaluate a screening practice will be discussed.

Sub-Events

RC801A Development

Participants
Ella A. Kazerooni, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

See course abstract

Honored Educators

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Ella A. Kazerooni, MD - 2014 Honored Educator

RC801B Benign and Prob Benign

Participants
Ann N. Leung, MD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the CT findings and types of abnormalities that are classified under the 'Benign' and 'Probably Benign' categories.

RC801C Suspicious/Malignant

Participants
James G. Ravenel, MD, Charleston, SC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

View abstract under main course title.

RC801D Significant Other Findings

Participants
Reginald F. Munden, MD, DMD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

See learning objectives under main course title

ABSTRACT

View abstract under main course title

RC801E Practice Metrics and Audit

Participants
William C. Black, MD, Lebanon, NH, (William.C.Black@Hitchcock.Org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Active Handout:William C. Black

http://abstract.rsna.org/uploads/2015/14000756/RC801E.pdf

RC801F Panel Discussion

Participants

RC802

Modern Methods of Education - Innovation, Social Media, and Active Learning

Friday, Dec. 4 8:30AM - 10:00AM Location: E351

ED

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Mahesh M. Thapa, MD, Seattle, WA (*Moderator*) Nothing to Disclose

Sub-Events

RC802A Beyond Slideshows...Innovative Methods to Make Presentation

Participants
Jeffrey P. Otjen, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss innovative methods that can improve radiology education initiatives. 2) Review the pros and cons of these various strategies.

RC802B Using Social Media for Radiology Education

Participants
Arnold C. Merrow JR, MD, Cincinnati, OH, (carl.merrow@cchmc.org) (*Presenter*) Author with royalties, Reed Elsevier; Consultant, Reed Elsevierr ;

LEARNING OBJECTIVES

1) To discuss possible roles for social media utilization in radiology education. 2) To review advantages and disadvantages of various social media platforms for engaging radiology learners. 3) To enable attendees to leverage social media applications for their teaching goals.

RC802C The Flipped Classroom - Engagement through Active Learning

Participants
Mahesh M. Thapa, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Reiterate the difference between active and passive learning. 2) Describe the principles of Active Learning. 3) Incorporate the principles of Active Learning into his/her teaching.

RC803

Quantitative Measures in Cardiac CT and MR Imaging-Do They Matter?

Friday, Dec. 4 8:30AM - 10:00AM Location: E350

CA BQ CT MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

LEARNING OBJECTIVES

ABSTRACT

Sub-Events

RC803A Quantitative Assessment of the Cardiac Chambers and Its Clinical Significance

Participants
Bernd J. Wintersperger, MD, Toronto, ON, (bernd.wintersperger@uhn.ca) (*Presenter*) Speakers Bureau, Siemens AG; Research support, Siemens AG

LEARNING OBJECTIVES

1) Describe the approach of cardiac MR and CT in assessment of cardiac function and size 2) Understand important differences between varies imaging strategies 3) Understand the impact and role of cardiac size and function on treatment decisions

ABSTRACT

Introduction:Cardiac performance is generally assessed by volumetric quantifications such as size and output. Follow-up and changes over time may allow identification of early disease onset, may trigger specific therapies and may allow prediction of patient prognoses and general outcome.While CT & MR imaging provide more accurate results, echocardiography remains the first line modality. CT for functional evaluation should be considered a 3rd line option based on the added radiation exposure.Methods:Most important measures of cardiac function are end-diastolic volume (EDV), stroke volume (SV) and ejection fraction (EF). While the acoustic window may limit echocardiography, CT & MRI can easily cover all aspects of the atria and ventricles. While results of clinical echocardiography may only allow a categorization of ventricular EF (grade 1-4) with large variations related to assumptions, CT and MRI allow highly accurate results in normal & abnormal ventricles. In order to maintain accuracy and precision adequate imaging parameters with respect to coverage, spatial resolution and temporal resolution are required. Today's functional cardiac MR imaging is based on cine SSFP methods with cardiac short axis orientation for the left ventricle and short axis or transverse orientation for the right ventricle. Atrial volumetric assessment is performed rarely but might especially be of interest in patients with AV valve dysfunction or atrial sources of arrhythmia. While quantitative assessment of regional motion was previously limited to echocardiography or specific MR techniques (e.g. MR tagging), recent software developments also allow this information being derived from standard cine MRI. ConclusionBased on its accuracy cardiac MR plays an increasingly important role in assessment of patients with cardiac diseases. Accurate and precise quantification of cardiac function is increasingly important in therapy decisions and therapy monitoring.

Handout:Bernd J. Wintersperger

http://abstract.rsna.org/uploads/2015/14000904/RSNA 2015 RC803A Quantitative Measures in Cardiac CT and MR Imaging_ Quantitative Assessment of the Cardiac Chambers and Clinical Significance.pdf

RC803B Quantitative Assessment Cardiac Valves on MRI

Participants
Jens Bremerich, MD, Basel, Switzerland, (jens.bremeric@usb.ch) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Apply CMR for morphometry and quantification of valvular function. 2) Compare various CMR approaches for assessment of cardiac valves. 3) Analyse flow data in stenotic or incompetent valves.

ABSTRACT

Introduction: Echocardiography remains first line modality for imaging cardiac valves. In specific cases, however, MR provides complementary quantitative data. Methods: Most relevant sequences for valve imaging are: 1) Black blood, 2) CineSSFP, and 3) VENCine. Black blood images are fast spin echo sequences. CineSSFP are used for quantification of valvular morphology and motion. Temporal resolution is typically 50ms for a segmented breath hold sequence but may be further shortened by means of parallel imaging or non-breath hold sequences. VENCine is an excellent tool for flow volume and velocity quantification. Volumes are relevant to calculate regurgitant fraction of incompetent valves, velocities are used to calculate degree of stenosis relying on modified Bernoulli equation. Results: Aortic regurgitation is difficult to evaluate with Echocardiography but easily quantified on VENCine with excellent reproducibility. Regurgitant fraction is defined as $Volume_{antegrade}/Volume_{retrograde}*100$ [%]. Aortic stenosis may also be quantified with MR by measuring the opening area on CineSSFP or by measuring peak velocity in the valve on VENCine and calculation with modified Bernoulli equation ($\Delta P = 4 * Vmax2$). Mitral regurgitation may also be quantified by MRI. Echocardiographic quantification relies predominantely on the extent of the regurgitant jet into the left atrium which is not a reliable sign on MRI, since extent of regurgitant jets depend on various sequence parameters such as field strength and echo time. Pulmonary regurgitation can also be quantified with MRI which is relevant in congenital heart disease such as after surgical repair in tetralogy of Fallot. Pulmonary stenosis, Tricuspid stenosis and regurgitation are no routine indications for MRI but are rather evaluated by echocardiography. Conclusion: Aortic regurgitation is an excellent indication for MRI, it enables accurate and

reproducible quantification.

RC803C How to Quantify Valve Function on Cardiac CT

Participants
Paul Schoenhagen, MD, Cleveland, OH, (schoenp1@ccf.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the limited role of CT for assessment of valvular function. 2) Discuss clinical indications where anatomic and functional valvular with CT is indicated. 3) Describe data acquisition and analysis approach for valvular assessment.

ABSTRACT

CT is a predominantly anatomic imaging modality. Compared to predominantly functional modalities its temporal resolution is limited. In addition, functional/4-D imaging requires retrospective gated data acquisition and is associated with higher radiation exposure. The role of CT for functional valvular analysis is therefore limited to few clinical scenarios, where it can provide complementary information. The strength of CT in these situations is the ability for reconstruction in the acquired 3-D/4-D volume. A prominent example is transcatheter valve replacement/implantation but also assessment of prosthetic valves.

URL

Handout:Paul Schoenhagen

http://abstract.rsna.org/uploads/2015/14000907/schoenhagen_RSNA2015 - valve function 11_30.pdf

RC803D 4D Flow MRI Quantification?

Participants
Christopher J. Francois, MD, Madison, WI (*Presenter*) Research support, General Electric Company

LEARNING OBJECTIVES

1) Describe MRI physics of 4D flow MRI. 2) Illustrate use of 4D flow MRI for basic hemodynamic function. 3) Demonstrate potential futures uses of 4D flow MRI for advanced hemodynamic analyses.

ABSTRACT

MRI flow imaging is based on flow-sensitive, phase contrast sequences. This presentation will introduce the basic MRI physics responsible for imaging flow, extending 1-directional flow imaging to 3-directional flow imaging used in 4D flow MRI.Examples from valvular and congenital heart disease will be used to illustrate the use of 4D flow MRI to quantify flow velocities and volumes. Although 4D flow MRI is still very much in the early developmental phase, published data comparing 4D flow MRI to established techniques for quantifying flow will be reviewed.The future potential for 4D flow MRI to be used to non-invasively quantify more advanced hemodynamic parameters will be demonstrated. Specifically, the use of 4D flow MRI to measure pressure gradients, pulse wave velocity, wall shear stress and kinetic energy will be covered.

Active Handout:Christopher Jean-Pierre Francois

http://abstract.rsna.org/uploads/2015/14000908/RC803D.pdf

RC804

Musculoskeletal Series: Shoulder and Elbow MR Imaging

Friday, Dec. 4 8:30AM - 12:00PM Location: E451A

MK CT MR

ARRT Category A+ Credits: 4.00
AMA PRA Category 1 Credits ™: 3.25

FDA Discussions may include off-label uses.

Participants
Douglas W. Goodwin, MD, Lebanon, NH, (douglas.goodwin@hitchcock.org) (*Moderator*) Nothing to Disclose
Jenny T. Bencardino, MD, New York, NY (*Moderator*) Nothing to Disclose

ABSTRACT

Handout:Jenny T. Bencardino

http://abstract.rsna.org/uploads/2015/15001699/Bencardino Triceps tendon and cubital tunnel.pdf

Sub-Events

RC804-01 Pitfalls in Shoulder MRI Interpretation

Friday, Dec. 4 8:30AM - 8:55AM Location: E451A

Participants
Douglas W. Goodwin, MD, Lebanon, NH, (douglas.goodwin@hitchcock.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize a series of pitfalls encountered in shoulder MRI, including variations in normal anatomy and subtle frequentlyoverlooked injuries and abnormalities. 2) Understand how imaging parameters can be manipulated to account for the inherent challenges of shoulder MR imaging. 3) Improve performance by adjusting patterns of image review.

Active Handout:Douglas W. Goodwin

http://abstract.rsna.org/uploads/2015/15001700/RC804-01handout Avoiding pitfalls in shoulder MR imaging.pdf

RC804-02 3D-CT vs. 3D-MR of the Shoulder in Patients with Glenohumeral Instability

Friday, Dec. 4 8:55AM - 9:05AM Location: E451A

Participants
Laurence D. Stillwater, MD, Winnipeg, MB (*Presenter*) Nothing to Disclose
James K. Koenig, MD, Winnipeg, MB (*Abstract Co-Author*) Nothing to Disclose
Bruce W. Maycher, MD, Winnipeg, MB (*Abstract Co-Author*) Nothing to Disclose
James M. Davidson, MD, Winnipeg, MB (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine if 3DMR osseous reformats of the shoulder are equivalent to 3DCT osseous reformats in patients with glenohumeral instability.

METHOD AND MATERIALS

Patients with glenohumeral instability, who were to be imaged with both CT and MRI, were prospectively selected. CT and 3TMR were performed within 24 hours of one another on 10 shoulders. Each MR study included an axial 3D isotropic VIBE sequence (acquisition time 4 minutes 15 seconds). The image data from the isotropic VIBE sequence was post processed using subtraction and 3D software. CT data was post processed using 3D software. The following measurements were obtained for both 3DCT and 3DMR post processed images: height and width of the humeral head and glenoid, Hill-Sachs size and percent humeral head loss (if present), Bankart size and percent glenoid bone loss (if present). Paired T-tests and two one-sided tests for equivalence were used to assess the differences between imaging modalities and equivalence.

RESULTS

The measurement differences from the 3DCT and 3DMR post processed images were not statistically significant: humeral height p=0.06, 95% CI [-0.03, 0.99], humeral width p=0.13, 95% CI [-0.14, 0.90], Hill-Sachs size p=0.42, 95% CI [-0.17, 0.37], percent humeral head loss p=0.93, 95% CI [-0.49, 0.53], glenoid width p=0.13, 95% CI [-0.01, 0.64], Bankart size p=0.43, 95% CI [-0.22, 0.42] and percent glenoid bone loss p=0.22, 95% CI [-0.52, 1.68]. The measurement difference for glenoid height was borderline, p=0.04, 95% CI [0.01, 0.43], however using any adjustment for multiple comparisons this failed to be significant. Using an equivalence margin of 1 mm for measurements and 1.5% for percent bone loss, the 3DMR and 3DCT post processed images were equivalent.

CONCLUSION

3DMR osseous models of the shoulder using a 3D isotropic VIBE sequence were equivalent to 3DCT osseous models and the differences between modalities were not statistically significant. This sequence can be added to MR examinations with only a minimal increase in imaging time and can be used to quantify humeral head and glenoid bone loss. This may eliminate the need for pre-surgical CT examinations pending continued recruitment to obtain a larger sample size.

CLINICAL RELEVANCE/APPLICATION

3DMR osseous reformats are equivalent to and demonstrate no significant statistical difference from 3DCT osseous reformats, which

3D PR osseous reformats are equivalent to and demonstrate no significant statistical difference from 3D CT osseous reformats, which may eliminate the need for preoperative CT.

RC804-03 Effect of Rotator Cuff Tendon Retraction on Grading of Supraspinatus Muscle Atrophy and Fatty Degeneration

Friday, Dec. 4 9:05AM - 9:15AM Location: E451A

Participants
Vanessa M. Finato, MD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Eric Y. Chang, MD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Brady K. Huang, MD, San Diego, CA (*Presenter*) Nothing to Disclose

PURPOSE

Many rotator cuff muscle classifications are in use, making it difficult to compare results and agree on treatment. Muscle atrophy and fatty degeneration are negative prognostic factors for clinical and structural outcome after repair. The 5 point Goutallier classification (Clin Orthop Relat Res 1994) was subsequently simplified by Fuchs (J Shoulder Elbow Surg 1999) into a 3 point system. Thomazeau (Acta Orthop Scand 1996) introduced a system based on the cross-sectional area (CSA) of the supraspinatus (SS) muscle on sagittal oblique (SAG) images with respect to the area of the SS fossa, reported as an occupation ratio (OR). Currently, there are no studies accounting for tendon retraction and its affect on grading.

METHOD AND MATERIALS

This IRB approved, HIPAA compliant retrospective study was performed using radiology reports from a single institution. Search terms of 'retraction' or 'retracted' were applied to non-arthrogram MRI reports from Jan 2014-Jan 2015. Full-thickness SS tendon tears were included. Partial-thickness tears and post-operative cases were excluded. MRI exams were reviewed by an MSK radiologist. Degree of tendon retraction was recorded. Thomazeau CSA and OR was recorded at the standard reference location on SAG images. OR was re-measured correcting for tendon retraction, medial to the reference location, obtaining a new (corrected) CSA. Fuchs grading was applied to both coronal (COR) and SAG planes. Paired Wilcoxon signed-ranks test was used to compare measurements. 25% of the cases were remeasured and independently measured by a second reader and reliability statistics were calculated.

RESULTS

79 patients were in the study group (71/150 excluded). Mean SS CSA at the standard vs corrected location was 4.0±1.6 cm2 (mean±SD) vs 5.6±1.7 cm2 ($p<0.001$). OR was 0.44±0.13 vs 0.62±0.12 ($p<0.001$). Standard Thomazeau and corrected stages revealed a concordance of 17.7% (14/79). Concordance for SAG and COR Fuchs staging was 94% (74/79). Inter- and intra-observer reliability statistics were excellent for OR, corrected OR, Thomazeau Stage, and SAG/COR Fuchs (ICC=0.832-0.997).

CONCLUSION

Accounting for tendon retraction is important in assessing SS atrophy and can significantly alter the grading using standard systems. Caution should be used when reporting these findings, as SS atrophy may be overestimated.

CLINICAL RELEVANCE/APPLICATION

Tendon retraction can result in overestimation of SS muscle atrophy, which may ultimately alter the decision to perform a cuff repair.

RC804-04 Distal Clavicular Osteolysis in Adults: Prevalence, Predisposing Factors, Treatment and Outcome

Friday, Dec. 4 9:15AM - 9:25AM Location: E451A

Participants
Mika T. Nevalainen, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Michael G. Ciccotti, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
William B. Morrison, MD, Philadelphia, PA (*Abstract Co-Author*) Consultant, General Electric Company Consultant, AprioMed AB Patent agreement, AprioMed AB Consultant, Zimmer Holdings, Inc
Adam C. Zoga, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Johannes B. Roedl, MD, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the prevalence, imaging findings, treatment and outcome of distal clavicular osteolysis (DCO) in adults as well as the association with bench pressing intensity.

METHOD AND MATERIALS

Patients with atraumatic DCO were selected in a retrospective review of 4217 consecutive magnetic resonance imaging (MRI) shoulder reports of individuals between 20 and 40 years of age. The prevalence of DCO, the DCO grade (mild, moderate, severe), pain scale, bench pressing frequency (times per week and years of bench pressing), bench pressing weight (maximum single repetition and per body weight), conservative and surgical treatment outcome and the long-term sequelae on follow-up MRI were analyzed.

RESULTS

8% (342/4217) of patients between 20 and 40 years of age had atraumatic DCO and 9% of these were females. 82% of DCO patients were bench pressing on a regular basis compared to 41% in the control group ($p<0.001$, chi-square). In male bench pressers who suffered from DCO (n=240), the mean bench pressing weight (maximum single repetition) was 283 lbs (±SD 57) compared to 209 lbs (±SD 60) in male bench pressers not affected by DCO (n=127; $p<0.001$, Mann-Whitney). Intense bench pressing with a bench pressing weight (maximum single repetition) of more than 1.5 times the body weight was a risk factor for DCO (OR=18; 95%CI=11-31, $p<0.001$). High frequency (>1x/week) and duration (>5 years) of bench pressing further increased the risk. 77% of DCO patients responded to conservative therapy, and 23% underwent surgery with resolution of symptoms. On follow-up imaging, acromioclavicular (AC) joint osteoarthritis was significantly more common in DCO patients treated conservatively than in DCO patients treated surgically (74% vs. 47% $p<0.001$, chi-square).

CONCLUSION

Prevalence of DCO in adults undergoing shoulder MRI is 8%, and females are affected in 9% of cases. Bench pressing more than 1.5 times the body weight is a substantial risk factor. AC joint osteoarthritisis a long-term sequela of conservative, but not surgical treatment of DCO.

CLINICAL RELEVANCE/APPLICATION

DCO is associated with AC joint osteoarthritis on follow-up imaging. Maximum bench pressing weight should be kept below 1.5 times the body weight to prevent DCO.

RC804-05 Non-contrast MRI Diagnosis of Adhesive Capsulitis

Friday, Dec. 4 9:25AM - 9:35AM Location: E451A

Participants
Andrew S. Chi, MD, MS, Philadelphia, PA (*Presenter*) Nothing to Disclose
John Kim, MD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Suzanne S. Long, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
William B. Morrison, MD, Philadelphia, PA (*Abstract Co-Author*) Consultant, General Electric Company Consultant, AprioMed AB Patent agreement, AprioMed AB Consultant, Zimmer Holdings, Inc
Adam C. Zoga, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The MR arthrographic findings of adhesive capsulitis or frozen shoulder are well described. However, adhesive capsulitis most commonly occurs in patients age 45 to 60 years old, a population for whom direct MR arthrography is rarely ordered. We sought to investigate specific noncontrast MRI findings and constellations of MRI findings in patients with clinical adhesive capsulitis.

METHOD AND MATERIALS

A prospective assessment of a retrospective study group was performed. 31 non-contrast, non-arthrographic, shoulder MRI exams were divided into subject and control groups (mean age 55.8 years; 10 men, 20 women). Two blinded MSK radiologists evaluated the MRI exams for coracohumeral ligament thickness >2 mm, fatty infiltration of the rotator interval, and thickening/edema of the inferior joint capsule/axillary recess. Clinical diagnosis of adhesive capsulitis was provided by orthopedic surgery physical exams. One patient with clinical suspicion of adhesive capsulitis was excluded due to concomitant traumatic labral tear, leaving 15 subjects in each group.

RESULTS

A triad of MRI findings is associated with adhesive capsulitis. Adhesive capsulitis can be diagnosed on noncontrast shoulder MRI with high sensitivity/low specificity, intermediate sensitivity and specificity, or high specificity/low sensitivity based on the number of MRI criteria observed. Using a single criterion of coracohumeral ligament thickening, sensitivity is 76.7% and specificity is 53.3% for detection of adhesive capsulitis. Using two criteria of coracohumeral ligament thickening and fatty infiltration of the interval, sensitivity is 66.7% and specificity is 55.2%. Using all three criteria of coracohumeral ligament thickening, interval infiltration, and axillary recess thickening/edema, sensitivity is 23.3% and specificity is 86.7%.

CONCLUSION

Adhesive capsulitis can be accurately diagnosed on routine noncontrast shoulder MRI in conjunction with appropriate clinical criteria. The finding of a thickened coracohumeral ligament shows strong sensitivity for adhesive capsulitis while the constellation of coracohumeral ligament thickening, subcoracoid fatty infiltration of the rotator interval, and axillary recess thickening/edema yields great specificity for adhesive capsulitis.

CLINICAL RELEVANCE/APPLICATION

Routine noncontrast MRI findings in adjunct with clinical findings suspicious for adhesive capsulitis can provide accurate diagnosis without need for direct MR arthrography.

RC804-06 Extraarticular Shoulder MRI

Friday, Dec. 4 9:35AM - 10:00AM Location: E451A

Participants
David A. Rubin, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Modify MR imaging protocols of the shoulder to address suspected abnormalities in the chest wall that may refer symptoms to the shoulder joint. 2) Detect injuries in the shoulder muscles and tendons outside of the rotator cuff, and identify salient features on MR images that guide clinical management. 3) Assess the rib cage using for radiographically-occult injuries.

RC804-07 Postoperative Shoulder MRI

Friday, Dec. 4 10:10AM - 10:30AM Location: E451A

Participants
Lawrence M. White, MD, FRCPC, Toronto, ON (*Presenter*) Advisory Board, Siemens AG

LEARNING OBJECTIVES

1) Understand the general principles of common shoulder surgical procedures and their expected postoperative appearance at MR imaging.2) Review the value of MR imaging techniques in evaluation of the postoperative shoulder3) Identify MR imaging features of complications or recurrent pathology of the postoperative shoulder

ABSTRACT

This presentation will cover the expected spectrum of findings in the postoperative shoulder following common modern surgical

This presentation will cover the expected spectrum of findings in the postoperative shoulder following common modern surgical procedures. The value of MR imaging in the evaluation of recurrent or residual symptoms post shoulder surgery will be reviewed, highlighting the MR imaging features suggestive of complications, or recurrent and residual pathology.

RC804-08 Imaging of the Post Operative Shoulder: Which Imaging Modality is Most Accurate?

Friday, Dec. 4 10:30AM - 10:40AM Location: E451A

Participants
Thomas H. Magee, MD, Indian Harbour Beach, FL (*Presenter*) Nothing to Disclose

PURPOSE

Post operative shoulder patients are often difficult to image due to scar tissue, metallic artifact,and residual irregularity of anatomic structures . We report the accuracy of MR imaging versus MR arthrography versus CT arthrography in assessment of the post operative shoulder in the same patient population.

METHOD AND MATERIALS

One hundred consecutive post operative conventional shoulder MR and MR arthrography exams performed on the same patients were reviewed retrospectively by two musculoskeletal radiologists. Nineteen of these patients also had CT arthrography performed. Exams were assessed for labral tears and supraspinatus tendon tears. All patients went on to arthroscopy.

RESULTS

Of these one hundred patients, thirty-two had SLAP (superior labral anterior to posterior) tears , sixteen had posterior labral tears , nineteen had anterior labral tears and forty-two had full thickness supraspinatus tendon tears on conventional MR exam.On MR arthrogram exam forty six patients had SLAP tears, twenty-two had posterior labral tears, twenty-four had anterior labral tears and fifty-one had full thickness supraspinatus tendon tears .MR arthrogram detected fourteen SLAP tears,six posterior labral tears, five anterior labral tears and nine supraspinatus tendon tears not detected on conventional MR exam. Nineteen patients had additional imaging performed with CT arthrography due to metallic artifacts precluding MR assessment of shoulder pathology. There were two SLAP tears, three posterior labral tears, four anterior labral tears and one supraspinatus tendon tear seen on CT arthrography not seen on MR exam.

CONCLUSION

MR arthrography is more accurate than conventional MR in assessment of post-operative shoulder pathology. CT arthrography can detect additional pathology when there is metallic artifact in post operative patients. It is beneficial to inject a combination of gadolinium and CT contrast at arthrography so CT imaging can be performed post arthrography if metallic artifact precludes imaging shoulder pathology by MR.

CLINICAL RELEVANCE/APPLICATION

MR arthrography is more accurate than conventional MR in assessment of post operative shoulder pathology. It is beneficial to inject a combination of gadolinium and CT contrast at arthrography so CT imaging can be performed post arthrography if metallic artifact precludes imaging shoulder pathology by MR.

RC804-09 Biometry of theGlenoid: How to Choose the Right Prosthesis for the Right Patient in Reverse Shoulder Arthroplasty?

Friday, Dec. 4 10:40AM - 10:50AM Location: E451A

Participants
Sami El Ramadan, MD, Besancon, France (*Presenter*) Nothing to Disclose
Gauthier Menu, Besancon, France (*Abstract Co-Author*) Nothing to Disclose
Christelle Peyron, MD, Besancon, France (*Abstract Co-Author*) Nothing to Disclose
Carlos Torrens Canovas, Besancon, France (*Abstract Co-Author*) Nothing to Disclose
Laurent Obert, MD,PhD, Besancon, France (*Abstract Co-Author*) Nothing to Disclose
Sebastien L. Aubry, MD, PhD, Besancon, France (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Reverse shoulder arthroplasty has become popular in the treatment of excentrated omarthrosis. However even with up-to-date prosthetic designs and surgical techniques, complications are still frequent. Variations of the glenoid in the general population regarding patient's height, glenoid width and glenoid bone stock, have never been precisely assessed. This could help orthopaedic surgeons to choose the right reverse shoulder implant for one patient. The purpose of the study is 1) to provide a structural analysis of glenoid size and bone stock and 2) to optimize the selection of prosthetic size.

METHOD AND MATERIALS

Sixty-four slice MDCT of 50 normal shoulders were used for this study (Siemens Healthcare, Erlangen Germany). The biometry of the glenoid was assessed on PACS multiplanar and 3D reconstructions : we measured the surface of the largest circle covering the glenoid and being tangent to the inferior rim, the diameter of the circle, the height of the glenoid and the depth of the bone stock at nine representative target points. Glenoid were divided into 3 groups based on the diameter of the circle and correlation with patient's height and bone stock was performed.

RESULTS

Patient's were 62.42+/-12.87 year old and measured 166.96+/-9.63 cm. There was a significant correlation between patient's height, glenoid surface and glenoid diameter. Glenoid can be subdivided into three size groups : small (diameter<26mm), medium (diameter ranging from 26mm to 28mm) and big glenoid (diameter>28mm). There was no correlation between patient's height and glenoid height. Three target points had a bone stock correlated to glenoid size, whereas other target points did not.

CONCLUSION

Patients can be grouped into three distinct categories based on glenoid diameter but not on glenoid height. Glenoid bone stock and the length of the prosthetic screw is constant except antero-inferiorly.

CLINICAL RELEVANCE/APPLICATION

The knowledge of glenoid diameter may be useful to prevent mismatch of prosthetic shoulder implant by choosing between small, medium or big implants.

RC804-10 Imaging of the Unstable Elbow

Friday, Dec. 4 10:50AM - 11:15AM Location: E451A

Participants
Mark W. Anderson, MD, Charlottesville, VA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List the primary stabilizing ligaments of the elbow. 2) Describe the role of the ulnar collateral ligament in the development of the valgus overload syndrome. 3) Discuss the bone and soft tissue injuries commonly found after posterior dislocation of the elbow.

ABSTRACT

Stability of the elbow depends heavilty upon the medial and lateral collateral ligament complexes. This session will focus on the normal anatomy of these ligaments as well as the most common types of ligament pathology that result in elbow instability and the radiographic and MR imaging findings that are seen in these conditions.

Active Handout:Mark W. Anderson

http://abstract.rsna.org/uploads/2015/15001703/RC804-10.pdf

Handout:Mark W. Anderson

http://abstract.rsna.org/uploads/2015/15001703/FINAL RSNA 2015 IMAGING THE UNSTABLE ELBOW 12.04.15 SYLLABUS ANDERSON.pdf

RC804-11 The Legend of the Luschka's Tubercle and its Association with Snapping Scapulae: Osseous Morphology of Snapping Scapulae on 2D and 3D CT Images

Friday, Dec. 4 11:15AM - 11:25AM Location: E451A

Participants
Tobias J. Dietrich, MD, Zurich, Switzerland (*Presenter*) Nothing to Disclose
Christoph A. Agten, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Philipp Furnstahl, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Lazaros Vlachopoulos, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Christian W. Pfirrmann, MD, MBA, Forch, Switzerland (*Abstract Co-Author*) Advisory Board, Siemens AG; Consultant, Medtronic, Inc

PURPOSE

To determine the osseous morphology of snapping scapulae on CT images in comparison with a control group.

METHOD AND MATERIALS

Two and three-dimensional CT images of scapulae of 34 patients with a snapping scapula were compared to a control group of 34 age and gender matched patients without a snapping scapula. Two blinded observers analyzed the following parameters: The presence of the so-called Luschka's tubercle was rated as yes or no. Measurements of the thickness and length of the superior angle of the scapula, the distance from the superior angle to the inferior angle, the depth of the subscapular fossa, the minimal distance between the scapula and rib cage, and the angle between the superior angle of the scapula and the subscapular fossa were obtained. The superior angle of the scapula was rated as concave or convex. Abnormalities of the rib cage and periscapular soft tissues were noted. The Fisher's exact test and Student's t-test served for data analysis.

RESULTS

In snapping scapula patients observer 1 did not find any Luschka's tubercle while observer 2 detected one Luschka's tubercle compared to two Luschka's tubercle in the control group for both observers (p-values>0.48). The superior angle of the scapula was significantly thicker in the snapping scapula group compared to the control group for both observers (observer 1: 4.8±1.3 mm versus 4.1±1.1 mm, observer 2: 5.1±1.6 versus 4.1±1.3 mm, p-values<0.02). The subscapular fossa was significantly deeper in snapping scapula patients compared to control group patients for both observers (observer 1: 21.9±5.0 mm versus 18.8±4.5 mm, observer 2: 28.6±5.9 mm versus 25.1±5.6 mm, p-values<0.035). The comparison of the remaining parameters did not differ significantly between the groups. No abnormalities of the rib cage and periscapular soft tissues were found in snapping scapula patients.

CONCLUSION

The superior angle of the scapula was significantly thicker and the subscapular fossa was significantly deeper in patients with a snapping scapula compared to control group patients. The Luschka's tubercle was rarely seen and not associated with a snapping scapula.

CLINICAL RELEVANCE/APPLICATION

CT images may detect subtle osseous variants in patients with a snapping scapula. Neither published original articles nor the present data suggest an association between the Luschka's tubercle and a snapping scapula.

RC804-12 Ultrasound Elastography Assessment of Changes in Ulnar Nerve Stiffness with Elbow Flexion

Friday, Dec. 4 11:25AM - 11:35AM Location: E451A

Participants
Tony T. Wong, MD, New York, NY (*Presenter*) Nothing to Disclose
Ronny Li, New York, NY (*Abstract Co-Author*) Nothing to Disclose

Dana Lin, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Ada Ip, San Ramon, CA (*Abstract Co-Author*) Nothing to Disclose
Elisa E. Konofagou, PhD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The intraneural pressure of the ulnar nerve (UN) within the cubital tunnel increases during elbow flexion. The purpose of this study is to determine whether ultrasound elastography can detect corresponding changes in nerve stiffness at the cubital tunnel and at defined distances away from it.

METHOD AND MATERIALS

Institutional review board and informed consent were obtained. Prospective examination of the UN in twenty elbows for ten consecutive volunteers was performed with ultrasound elastography.Each UN was examined in four positions while the elbow was in full extension: at the cubital tunnel, 4 cm proximal, 4 cm distal, and 8 cm distal. The elbow was then placed in full flexion (145 degrees) for three minutes and the entire examination was repeated.All ultrasounds were performed by a single radiologist on a SonixTouch system (Analogic Corp., Peabody, MA, USA) with a 10 MHz linear array transducer. An acoustic coupler (C) (EZU-TECPL1, Hitachi-Aloka Medical) with a standardized elasticity was attached to the probe. Ultrasound radio-frequency (RF) signals were obtained at each time point with a compression-decompression cycle lasting 4-6 seconds. Inter-frame axial displacements of the UN were estimated offline using a 1D normalized cross-correlation-based motion estimation method (Luo and Konofagou 2010) on the RF signals. Based on these displacements, inter-frame strains were computed using a least-squares strain estimator (Kallel and Ophir 1997) and added together to obtain cumulative strains. UN stiffness at each interrogated position was semi-quantified as a mean cumulative strain ratio (C/UN).

RESULTS

P-values were calculated using a matched pairs t-test. The change in mean C/UN ratios +/- standard deviation from extension to flexion were as follows:At cubital tunnel: 1.31 +/- 0.98 to 2.41 +/- 0.88 (p-value < 0.00015)4 cm proximal: 0.50 +/- 0.37 to 0.41 +/- 0.27 (p-value 0.24)4 cm distal: 1.23 +/- 0.90 to 0.85 +/- 0.91 (p-value 0.14)8 cm distal: 2.61 +/- 1.41 to 2.01 +/-1.45 (p-value 0.10)

CONCLUSION

Increased UN stiffness within the cubital tunnel can be detected by ultrasound elastography shortly after elbow flexion. No significant changes are detected 4 cm proximal, 4 cm distal, and 8 cm distal.

CLINICAL RELEVANCE/APPLICATION

Ultrasound elastography can detect changes in ulnar nerve stiffness during elbow flexion without significant lag time. It has potential for diagnostic use in early nerve compression.

RC804-13 Distal Triceps Tendon and Cubital Tunnel

Friday, Dec. 4 11:35AM - 12:00PM Location: E451A

Participants
Jenny T. Bencardino, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the normal MR anatomy of the distal triceps tendon and cubital tunnel at the elbow. 2) To describe the clinical syndromes that affect the distal triceps tendon and cubital tunnel including insertional triceps tendon tears, snapping triceps syndrome and cubital tunnel syndrome. 3) To review the MR findings associated with distal triceps tendon disease and cubital tunnel syndrome.

ABSTRACT

Honored Educators

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Jenny T. Bencardino, MD - 2014 Honored Educator

RC805

Multiple Sclerosis: Updates and Controversies

Friday, Dec. 4 8:30AM - 10:00AM Location: N226

NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Aaron S. Field, MD, PhD, Madison, WI, (afield@uwhealth.org) (*Moderator*) Nothing to Disclose
Timothy M. Shepherd, MD, PhD, New York, NY (*Moderator*) Nothing to Disclose

Sub-Events

RC805A Multiple Sclerosis: What the Clinician Wants to Know

Participants
Christina Azevedo, MD, MPH, Los Angeles, CA (*Presenter*) Advisory Board, sanofi-aventis Group; Advisory Board, Biogen Idec Inc

RC805B New Multimodal Imaging Approaches for MS

Participants
Matilde Inglese, MD, New York, NY, (matilde.inglese@mssm.edu) (*Presenter*) Consultant, Vaccinex; Research Grant, Novartis AG;

LEARNING OBJECTIVES

1) Describe novel MRI techniques to study MS pathophisiology. 2) Discuss how novel MRI techniques contribute to monitoring of MS progression. 3) List the advantages of a multimodal imaging approach for predicting clinical outcomes.

ABSTRACT

The presentation will review novel MRI techniques applied to the study of MS patients to improve understanding of disease pathophysiology, to identify new and reliable markers of disease progression and effective predictors of short- and long-term clinical outcomes.

RC805C Differential Diagnosis in MS

Participants
Aaron S. Field, MD, PhD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe both typical and atypical appearances of MS on conventional MRI. 2) List the most common differental diagnoses for these imaging findings. 3) Recognize the distinguishing features that often allow discrimination of MS from potential mimics.

ABSTRACT

This presentation will review typical and atypical appearances of MS in brain and spinal cord on conventional MRI along with alternative diagnoses that often mimic MS and must be considered when these findings are present.

RC806

Head and Neck Emergency!

Friday, Dec. 4 8:30AM - 10:00AM Location: E450B

HN NR ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC806A Adult Non-Traumatic Emergencies

Participants
Karen L. Salzman, MD, Salt Lake City, UT, (karen.salzman@hsc.utah.edu) (*Presenter*) Consultant, Reed Elsevier; Stockholder, Reed Elsevier

LEARNING OBJECTIVES

1) Review imaging techniques of nontraumatic adult head and neck emergencies. 2) Recognize non-traumatic adult head and neck emergencies and diagnose the extent of disease and its complications.

RC806B Pediatric Non-Traumatic Head and Neck Emergencies

Participants
Caroline D. Robson, MBChB, Boston, MA (*Presenter*) Editor with royalties, Reed Elsevier; Author with royalties, Reed Elsevier;

LEARNING OBJECTIVES

1) Familiarize the audience with imaging protocols that should be used for assessing pediatric head and neck emergencies. 2) Recognize pediatric head and neck emergencies and effectively diagnose the extent of disease and its complications. 3) Provide reports that enable the referring clinician to effectively treat pediatric head and neck emergencies.

ABSTRACT

The talk will focus on pediatric airway obstruction.Please see attached pdf of the talk including two articles for reference regarding pediatric nasal lesions.

Abstract Handout:Caroline Diana Robson

http://abstract.rsna.org/uploads/2015/15001963/RC806B Pediatric Non-Traumatic Head and Neck Emergencies.pdf

RC806C Traumatic Head and Neck Emergencies

Participants
Lindell R. Gentry, MD, Madison, WI, (lgentry@uwhealth.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Demonstrate the most common traumatic lesions that are encountered in the head and neck. 2) Discuss the important traumatic complications of the face, orbit, skull base, temporal bone, and blood vessels. 3) Discuss imaging strategies to effectively diagnose these traumatic lesions and their complications.

ABSTRACT

Traumatic injury of the head and neck is one of the most important and common diagnostic problems that radiologists will encounter in daily practice. Because of the vulnerability of important bony and soft tissue structures in this region, significant traumatic and potentially life-altering complications may be encountered with blunt and penetrating traumatic forces. Traumatic forces may cause injury of the bony and soft tissue structures of the orbit, including the globe, extraocular muscles, optic nerve, and 3rd-6th cranial nerves. This may result in ocular rupture, extraocular muscle entrapment, retrobulbar hemorrhage, proptosis, traumatic optic neuropathy, and superior orbital fissure syndrome. Diagnosis and management of these orbital injuries will be reviewed.Significant dental malocclusion or malunion may arise from displaced fractures of the mandible. Critical airway compromise may be caused by traumatic injury of the mandible, larynx, and trachea. Skull base and temporal bone trauma may produce a number of important complications that will be addressed in this lecture. These include conductive and sensorineural hearing loss, cerebrospinal fluid leak, traumatic facial palsy, lower cranial nerve injury, as well as cerebrovascular injury. Cerebrovascular injury is one of the most important and potentially life-altering complications that may be encountered with both blunt and penetrating craniocervical trauma. The vulnerable position of the extracranial and intracranial cerebral vasculature makes these vessels highly susceptible to traumatic injury. Fractures of the skull base or cervical spine may cause a variety of critically important traumatic lesions (dissection, pseudoaneurysm, occlusion, rupture, arteriovenous fistula). This lecture will discuss high risk imaging signs that suggest the possibility of cervical or intracranial cerebrovascular trauma. The rational for effective imaging workup and identification of these injuries will be emphasized.

RC807

GYN and Pelvic Floor 2015: Latest Imaging Guidelines and Angles Simplified!

Friday, Dec. 4 8:30AM - 10:00AM Location: N227

GU CT MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Mark E. Lockhart, MD, Birmingham, AL, (mlockhart@uabmc.edu) (*Coordinator*) Nothing to Disclose
Reena C. Jha, MD, Washington, DC (*Presenter*) Nothing to Disclose
Maitray D. Patel, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe current best practice recommendations for management of adnexal asymptomatic, incidental, and/or potentially physiologic findings on pelvic US, CT, and MR based on lesion characteristics and patient clinical factors. 2) Understand the reference lines and angles in pelvic MRI that are used in the evaluation of pelvic floor disorders. 3) Understand the typical imaging characteristics of the endometrium and myometrium according to patient age and stage of the reproductive cycle, and review associated benign pathology.

ABSTRACT

This session will present on topics related to pelvic imaging. At the conclusion of the three presentations, the participants should have an improved understanding of imaging characteristics of the ovaries and uterus, including endometrium. Also, the imaging parameters used in evaluation of pelvic floor abnormalities such as organ prolapse and structural abnormalities related to incontinence will be reviewed. In each lecture, the imaging characteristics of a variety of disease processes will be covered.

Active Handout:Maitray D. Patel

http://abstract.rsna.org/uploads/2015/14000842/RC807.pdf

RC808

Emergency Ultrasound Pitfalls (An Interactive Session)

Friday, Dec. 4 8:30AM - 10:00AM Location: E353C

GI GU OB US ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC808A Pitfalls in Right Upper Quadrant Ultrasound

Participants
Mindy M. Horrow, MD, Philadelphia, PA, (horrowm@einstein.edu) (*Presenter*) Spouse, Director, Merck & Co, Inc

LEARNING OBJECTIVES

1) Describe technical factors that may improve visualization of cholelithiasis including appropriate frequency transducer and identification of gallbladder neck. 2) Identify non biliary causes of gallbladder wall thickening. 3) Recognize causes for non-visualization of a fluid filled gallbladder and how to differentiate the gallbladder from other fluid filled structures in the right upper quadrant. 4) Describe situations in which color Doppler is essential to detect renal causes of right upper quadrant pain.

Honored Educators

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Mindy M. Horrow, MD - 2013 Honored Educator

RC808B Pediatric Abdominal Ultrasound Pitfalls

Participants
Susan D. John, MD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Use optimal protocols for performing abdominal US in infants and children. 2) Avoid diagnostic errors in pediatric gastrointestinal US caused by common artifacts and variables in exam performance. 3) Recognize variations in pathology and important secondary findings that are helpful for the diagnosis of acute or emergent conditions in the pediatric abdomen.

ABSTRACT

RC808C Non-obstetrical Gynecologic Ultrasound Pitfalls

Participants
Ana P. Lourenco, MD, Providence, RI, (alourenco@lifespan.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize commonly encountered gynecological ultrasound pitfalls. 2) Describe strategies to avoid these pitfalls.

ABSTRACT

This session will review common pitfalls encountered in gynecologic ultrasound and highlight strategies for avoiding such pitfalls. Case-based presentations will illustrate the varied presentations of ovarian torsion, non-gynecologic etiologies for acute pelvic pain including ureteral calculi and acute appendicitis, and a variety of uterine, ovarian and adnexal abnormalities. The benefits and limitations of transabdominal and transvaginal imaging, as well as color Doppler, will be highlighted with examples to demonstrate the utility of each technique.

Active Handout:Ana P. Lourenco

http://abstract.rsna.org/uploads/2015/15003351/Active RC808C.pdf

RC808D First Trimester Ultrasound Pitfalls

Participants
Mariam Moshiri, MD, Seattle, WA (*Presenter*) Consultant, Reed Elsevier; Author, Reed Elsevier

LEARNING OBJECTIVES

1) To review the relatively recent report of the Society of Radiologists in Ultrasound, on new ultrasound criteria for evaluation of first trimester pregnancy. 2) To demonstrate potential pitfalls of sonographic performance and interpretation in the first trimester of pregnancy, and to discuss how to avoid them. 3) To review other relevant, very recent literature on first trimester pregnancy ultrasound performance and interpretation.

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Mariam Moshiri, MD - 2013 Honored Educator
Mariam Moshiri, MD - 2015 Honored Educator

RC809

Abdomen Radiographs and GI Fluoroscopy: Don't Bury 'em Yet!

Friday, Dec. 4 8:30AM - 10:00AM Location: N230

GI OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC809A Abdomen Radiographs: Just an Annoyance Before the CT, Right?'

Participants
David J. DiSantis, MD, Lexington, KY, (djdisantis@gmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) List the innate 'contrast materials' present in abdomen radiographs. 2) Use those cues to identify pathology.

ABSTRACT

Millions of abdomen radiographs still are performed yearly in the United States. If viewed in a more than perfunctory manner, they can reveal a spectrum of abnormalities. This presentation offers a fresh approach to ferreting out the clues to pathology hidden in the lowly KUB.

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David J. DiSantis, MD - 2014 Honored Educator

RC809B Esophagography 2015: What You Need to Know

Participants
Laura R. Carucci, MD, Midlothian, VA, (lcarucci@vcu.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the continuing importance of fluoroscopic evaluation of the esophagus. 2) Describe examination techniques for the esophagus. 3) Review the radiologic diagnosis of pathologic conditions involving the esophagus including functional and structural abnormalities.

ABSTRACT

Despite an overall trend towards a decreasing number of fluoroscopic procedures performed, the number of esophagography studies has proportionally increased in recent years. Fluoroscopic evaluation remains the primary modality for evaluating the esophagus. Radiologists should be able to perform and interpret esophagography studies. A spectrum of functional and structural abnormalities that may affect the esophagus will be discussed.

RC809C Fluoro Eyes Only: Role of Fluoroscopy in the Colon

Participants
Christine O. Menias, MD, Scottsdale, AZ, (menias.christine@mayo.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the role of plain film , fluorscopy and CT in the evaluation of colonic pathology. 2)Review the radiographic, fluoroscopic imaging features of a specturm of colonic pathologies, with CT correlation. 3) Review the fluoroscopic appearance of complications in the post-operative colon.

ABSTRACT

Despite the overall trend of the decreasing number of fluoroscopic screening studies of the colon, fluoroscopic evaluation of the colon is often requested in the post-operative or obstructed patient. Understanding the common surgical appearance of the post-operative colon, becomes important for the radiologist who is asked to evlauate for complications. Common surgical procedures as well as their complications will be discussed. In addition, a spectrum of entities that result in distal colonic obstruction will be discussed.

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Christine O. Menias, MD - 2013 Honored Educator
Christine O. Menias, MD - 2014 Honored Educator
Christine O. Menias, MD - 2015 Honored Educator

RC809D **Stomach and Small Bowel**

Participants
Dean D. Maglinte, MD, Indianapolis, IN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss essentials in the performance of fluoroscopic examinations of the postoperative gastrointestinal tract to: a. prevent complications, b. insure a diagnostic examination, c. avoid technical and interpretive pitfals.

ABSTRACT

Despite addvances in endoscopy and cross sectional imaging, fluoroscopic examinations of the postoperative GI tract has remained essential.. Rationale for its performance are: 1. to detect complications in the early (<4 weeks) or late (>4 weeks) post operative periods, 2. to assess the efficacy of the surgical procedure, and 3. to define anatomy and establish a baseline.A brief review of commonly performed surgical procedures will be given to insure understanding of the altered anatomy to insure complete anatomic coverage and enable performance of a 'tailored' diagnostic examination designed to answer clinical questions to guide management of the post surgical patient.Knowledge of the essentials on what contrast agents to use, how it should be administered and radiographic considerations (views/positioning) are emphasized to avoid procedure related complications and avoid pitfalls.

RC810

Vascular Doppler (An Interactive Session)

Friday, Dec. 4 8:30AM - 10:00AM Location: S402AB

VA US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC810A Beyond Peak Velocities: Waveform Interpretation in Carotid Doppler

Participants
Mark A. Kliewer, MD, Madison, WI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be familiar with how carotid waveforms change with systemic, regional and local vascular disease. 2) Be able to recognize common waveform variants and their attendant clinical significance.

Active Handout:Mark A. Kliewer

http://abstract.rsna.org/uploads/2015/15002014/RC810A.pdf

RC810B Upper and Lower Extremity Veins

Participants
Leslie M. Scoutt, MD, New Haven, CT, (leslie.scoutt@yale.edu) (*Presenter*) Consultant, Koninklijke Philips NV

LEARNING OBJECTIVES

1) This course will review the US criteria for the diagnosis of acute and chronic DVT, including a discussion of pitfalls in the US diagnosis of DVT. 2) Current controversies in the US evaluation of DVT will be reviewed. 3) The role of US in the diagnosis of alternative causes of leg pain and swelling will be described. 4) US diagnosis of DVT in the upper extremity will also be discussed.

ABSTRACT

This session will discuss the clinical presentation and epidemiology of deep venous thrombosis in the upper and lower extremities. The criteria for and pitfalls in the US the diagnosis of DVT will be discussed with an emphasis on current controversies in the role of US in the work up of patients with clinically suspected DVT. In addition, the role of US in idenitfying alternative causes of extremity pain and swelling will be presented.

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Leslie M. Scoutt, MD - 2014 Honored Educator

RC810C Upper and Lower Extremity Arteries

Participants
Michelle L. Robbin, MD, Birmingham, AL, (mrobbin@uabmc.edu) (*Presenter*) Consultant, Koninklijke Philips NV;

LEARNING OBJECTIVES

1) Describe normal anatomy and normal anatomic variants. 2) Demonstrate normal and abnormal waveform patterns. 3) Discuss methods to evaluate stenoses and occlusions, noting pitfalls.

ABSTRACT

Upper and lower extremity arterial ultrasounds are becoming more commonly requested because of concerns regarding expense and toxicity of CT/MRI contrast agents, as well as radiation associated with CT. Indications and standard US evaluation of the upper and lower extremity arteries will be detailed, including high brachial artery bifurcation (a normal variant), palmar arch evaluation prior to radial artery harvesting for CABG, and lower extremity arterial waveform analysis.

RC811

Improving PET Interpretation (An Interactive Session)

Friday, Dec. 4 8:30AM - 10:00AM Location: S505AB

CT NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

LEARNING OBJECTIVES

Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC811A Mimics and Interpretive Pitfalls: Advanced Tricks of the Trade

Participants
Eric M. Rohren, MD, PhD, Houston, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss interpretive pitfalls in FDG-PET/CT, including challenging and less-frequently encountered pitfalls. 2) Review strategies to avoid interpretive errors in FDG-PET/CT.

ABSTRACT

One of the challenges in the interpretation of FDG-PET/CT is the discovery of unexpected activity, and the determination whether such activity is related to the primary tumor, and incidental second primary tumor, or a benign process. Avoidance of 'false-positive' interpretations is critical for the development and maintenance of a robust PET/CT practice. In this presentatation, a broad range of case examples will be shown and discussed, to illustrate some of the most frequent and most challenging pitfalls encountered in a busy oncologic PET/CT practice.

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Eric M. Rohren, MD, PhD - 2015 Honored Educator

RC811B Impact of Patient Preparation

Participants
Don C. Yoo, MD, Providence, RI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the patient preparation issues with performing PET/CT. 2) Review recommendations on patient preparation prior to performing PET/CT. 3) Review the issues in performing PET/CT scans on diabetic patients and learn ways to optimize the glucose level.

ABSTRACT

F18-FDG PET/CT is a valuable tool for a variety of oncologic applications. The purpose of this educational activity is to discuss the importance of appropriate patient preparation prior to performing oncologic F18-FDG PET/CT scans. The recommendations from the American College of Radiology (ACR), the Society of Nuclear Medicine and Molecular Imaging (SNMMI), and the National Cancer Institute (NCI) for patient preparation will be discussed. Issues that will be discussed include fasting, limiting exercise, hydration, sedation, low carbohydrate meals, and diabetic patients. Patients are typically asked to fast for at least 4 hours before tracer injection for oncologic PET/CT scans. The ACR and SNMMI both recommend checking glucose levels on all patients prior to administration of F18-FDG. SNMMI guidelines recommend that patients with glucose of greater than 150-200 mg/dL should usually be rescheduled. Performing PET/CT scans in poorly controlled diabetic patients can result in a PET/CT scan with an altered biodistribution limiting interpretation of the study. In a poorly controlled diabetic patient with a glucose level of greater than 200 mg/dl, the study should usually be rescheduled if it does not critically affect patient care. Hyperglycemia will dilute the FDG uptake by tumors through competitive inhibition. Subcutaneous insulin should not be administered to a diabetic patient with high glucose within 4 hours of a PET/CT scan as insulin will stimulate FDG uptake by skeletal muscle resulting in an altered biodistribution which can severely limit interpretation.

RC811C Challenging Case Examples

Participants
Esma A. Akin, MD, Washington, DC, (Eakin@mfa.gwu.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) With the aid of challenging case examples, this activity aims improve PET-CT interpretation through recognition of pitfalls and variants. In addition, it aims to review typical as well as unusual examples of commonly encountered oncologic diagnoses.

ABSTRACT

RC812

Acute Abdominal Vascular Diseases (An Interactive Session)

Friday, Dec. 4 8:30AM - 10:00AM Location: E353B

GI VA CT ER

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

Sub-Events

RC812A Aortic Branch Dissections

Participants
Dominik Fleischmann, MD, Palo Alto, CA (*Presenter*) Research support, Siemens AG;

LEARNING OBJECTIVES

1) Review the epidemiology of aortic side-branch dissections, which can occur as a complication of aortic dissection, or as isolated spontaneous dissections of the visceral or renal arteries. 2) Explain the pathophysiology of side branch malperfusion syndromes in aortic dissection. 3) Present the spectrum of imaging findings in spontaneous aortic branch dissections, including the differential diagnosis (vasculitis, connective tissue diseases, fibromuscular dysplasia, segmental arterial mediolysis).

ABSTRACT

Dissections of aortic side branches is a common complication of Type A and Type B acute aortic dissection which substantially increases mortality. It is important to understand the pathophysiology and the two principle mechanisms of side branch malferfusion in aortic dissection: flow obstruction can be due to (A) local abnormalities, such as occlusive dissection flaps, blind ending false lumen with true lumen occlusion ('windsock'), or frank thrombosis. Side-branch malperfusion may also occur due to (B) limited inflow: The classic situation is complete true lumen collapse in the upstream aorta, resulting in underperfusion of all downstream branches supplied by the true lumen. Wile local obstructions are most commonly treated by stent placement into the diseased side branch, inflow-lesions typically require surgical or endovascular repair of the upstream aorta.Spontaneous dissections of the celiac, mesenteric, or renal arteries are relatively rare events, and typically present with acute abdominal or flank pain. Dissections of side branch arteries can lead to ischemic complications or to frank rupture with intra- or retroperitoneal hemorrhage. Patients presenting with mesenteric or renal artery dissection require a thorough workup to identify genetic disorders (notably Ehlers Danlos IV), inflammatory conditions (vasculitis), and other entities such as fibromuscular dysplasia and segmental arterial mediolysis (SAM). Imaging findings range from non-obstructive lesions such as intramural hematoma, double-barrel lumen, to partial or complete obstruction ('windsock'). Complications include rupture or ischemia. Spontaneous dissections may heal, or evolve into aortic branch aneurysms.

RC812B Symptomatic Aneurysms

Participants
Phillip M. Young, MD, Rochester, MN, (young.phillip@mayo.edu) (*Presenter*) Nothing to Disclose

ABSTRACT

Symptomatic aneurysms cover the spectrum of arterial aneurysms presenting with a) localized symptoms secondary to aneurysm expansion and possible rupture b) regional symptoms secondary to dissection and embolism and c) systemic cardiovascular dysfunction related to hypotension and organ dysfunction. Common clinical scenarios include aneurysm rupture - most commonly abdominal aortic, popliteal and abdominal visceral aneurysms as well as thoracoabdominal aortic dissection. Symptomatic aneurysms may also occur in patients with known arterial pathology including connective tissue disorders such as Marfan's and Ehlers-Danlos syndrome and Takayasu aortitis/arteritis. Patients with suspected rupture of abdominal aortic or ileofemoropopliteal artery aneurysms may initially be evaluated by sonography. However, in all circumstances, CT angiography due to its robust implementation and high-resolution imaging of the vasculature and regional anatomy that allows for planning of endovascular and surgical intervention is the preferred technique. CT Angiographic protocols appropriate to the suspected anatomic location of the aneurysm that provide an adequate roadmap for endovascular or surgical intervention are employed. Extended coverage is particularly important in patients with suspected thoracoabdominal aortic dissection or aneurysms associated with peripheral embolism. Cardiac gating should be utilized in any patient with a suspected type A aortic dissection or rupture of an ascending aortic aneurysm. Aortic, cardiac and coronary artery imaging are integral to the evaluation and management of these patients. A particular subset of the "symptomatic aneurysm" is post-trauma aortic disruption, usually thoracic in which diagnosis of traumatic aneurysm is critical and the aneurysm is associated with additional sites of soft tissue and skeletal trauma. Guidelines for endovascular or surgical intervention or non invasive management with serial CT Angiographic imaging will be discussed.

RC812C Mesenteric Ischemia

Participants
Iain D. Kirkpatrick, MD, Winnipeg, MB, (kirkpatrick_iain@hotmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss the various categories of mesenteric ischemia (arterial occlusive, embolic, venous thrombotic, and nonocclusive), and the pathophysiologic basis behind the imaging findings in each case. 2) Understand the basis behind modern CT protocols for mesenteric ischemia, particularly the biphasic examination with CT mesenteric angiography. 3) Demonstrate techniques to rapidly analyze a mesenteric CT angiographic dataset. 4) Review the CT signs of mesenteric ischemia and their sensitivity and specificity.

5) Evaluate the current literature on mesenteric ischemia and discuss optimal diagnostic criteria.

ABSTRACT

Acute mesenteric schema (AMI) is a life-threatening condition said to affect up to 1% of patients presenting with an acute abdomen, and it carries a mortality rate ranging between 59-93% in the published literature. Time to diagnosis and surgical treatment are the only factors which have been shown to improve mortality, and evidence shows that the clear test of choice for AMI is now biphasic CT. Water is preferably administered as a negative contrast agent, followed by CT mesenteric angiography and then a portal venous phase exam. Diagnostic accuracy is significantly improved by analysis of the CT angiogram for arterial stenoses or occlusions, evidence of emboli, or angiographic criteria of nonocclusive ischemia. It is the use of CT angiography in addition to routine portal phase imaging which has pushed the sensitivity and specificity of the test to >90% in recent published articles. Other nonangiographic CT findings that are relatively specific for AMI in the appropriate clinical setting include pneumatosis intestinalis, portal or mesenteric venous gas or thrombosis, and decreased bowel wall enhancement. Bowel wall thickening, mesenteric stranding, ascites, and mucosal hyperenhancement are more nonspecific findings which may also be seen. Nonocclusive schema may be the most difficult form to diagnose, and findings of shock abdomen can aid in identification. Knowledge of the patient's clinical history is critical not only for the selection of an appropriate study protocol but also for interpretation of the imaging findings in context.

RC812D Gastrointestinal Bleeding

Participants
Jorge A. Soto, MD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the appropriate implementation of CT angiography in the evaluation of patients presenting with acute lower intestinal bleeding. 2) To describe the technical details that are necessary for acquiring good quality CT angiography examinations. 3) Illustrate the characteristic CT angiographic findings of active or recent bleeding with specific examples of multiple etiologies.

ABSTRACT

Acute gastrointestinal bleeding is a serious condiition that may threaten a patient's life depending on the severity and duration of the event. Precise identification of the location, source and cause of bleeding are the primary objectivse of the diagnostic evaluation. Implementation of colonoscopy in the emergency setting poses multiple challenges, especially the inability to adequately cleanse the colon and poor visualization owing to the presence of intraluminal blood clots. Scintigraphy with technetium 99m-labeled red blood cells is highly sensitive but also has some limitations, such as the inability to precisely localize the source of bleeding and determine its cause. Properly performed and interpreted CT angiography examinations offer logistical and diagnostic advantages in the detection of active hemorrhage. A three-phase examination (non-contrast, arterial and portal venous) is typically performed. Potential technical and interpretation pitfalls should be considered and will be explained. The information derived from CT angiography helps direct therapy and select the most appropriate hemostatic intervention (when necessary): endoscopic, angiographic, or surgical. Precise anatomic localization of the bleeding point also allows a targeted endovascular embolization. The high diagnostic performance of CT angiography makes this test a good alternative for the initial emergent evaluation of patients with acute lower intestinal bleeding.

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Jorge A. Soto, MD - 2013 Honored Educator
Jorge A. Soto, MD - 2014 Honored Educator
Jorge A. Soto, MD - 2015 Honored Educator

RC813

Pediatric MSK

Friday, Dec. 4 8:30AM - 10:00AM Location: S502AB

MK PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC813A Imaging of Pediatric Musculoskeletal Infections

Participants
Robert Orth, MD, PhD, Houston, TX (*Presenter*) Research support, General Electric Company;

LEARNING OBJECTIVES

1) Describe the optimal imaging strategy for evaluating suspected pediatric musculoskeletal infections including specifics of the MRI protocol. 2) List common missed diagnoses and imaging pitfalls. 3) Describe methods for differentiating musculoskeletal infections from alternative diagnoses.

RC813B Imaging of Osteochondritis Dissecans

Participants
Jonathan D. Samet, MD, Chicago, IL, (jsamet@luriechildrens.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To identify imaging features of osteochondritis dissecans (OCD) using multiple modalities. 2) To recognize the spectrum of findings between low and high grade lesions. 3) To identify the varying postoperative appearances after surgical intervention.

ABSTRACT

For 'Imaging of Osteochondritis Dissecans'1. To identify imaging features of osteochondritis dissecans (OCD) using multiple modalities.2. To recognize the spectrum of findings between low and high grade lesions.3. To identify the varying postoperative appearances after surgical intervention.

RC813C Imaging of Musculoskeletal Soft Tissue Masses

Participants
Michele M. Walters, MD, Boston, MA (*Presenter*) Nothing to Disclose

RC814

Interventional Series: Complications in Interventional Oncology-Avoidance and Damage Control

Friday, Dec. 4 8:30AM - 12:00PM Location: N228

GI VA IR OI RO

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 3.75

FDA Discussions may include off-label uses.

Participants
Charles E. Ray JR, MD, PhD, Chicago, IL, (chary@uic.edu) (*Moderator*) Advisory Board, Novate Medical Ltd; Editor, Thieme Medical Publishers, Inc; ; ; ; ;
Robert J. Lewandowski, MD, Chicago, IL (*Moderator*) Advisory Board, BTG International Ltd; Advisory Board, Boston Scientific Corporation; Consultant, Cook Group Incorporated; Consultant, ABK Medical Inc

LEARNING OBJECTIVES

1) List 2 important recent publications in interventional oncology. 2) Explain the mechanism of one complication related to thermal ablation. 3) Describe 1 pitfall of radioembolization. 4) Outline 3 complications in combination therapy for hepatocellular carcinoma. 5) List three complications of chemo-embolization.

ABSTRACT

Sub-Events

RC814-01 Chemoembolization Complications

Friday, Dec. 4 8:30AM - 8:45AM Location: N228

Participants
Charles E. Ray JR, MD, PhD, Chicago, IL (*Presenter*) Advisory Board, Novate Medical Ltd; Editor, Thieme Medical Publishers, Inc; ; ; ; ;

LEARNING OBJECTIVES

View learning objectives under main course title.

RC814-02 DNA ChemoFilter: Novel Method to Prevent Toxicity from Intra-Arterial Administration of Chemotherapeutic

Friday, Dec. 4 8:45AM - 8:55AM Location: N228

Participants
Mariam S. Aboian, MD, PhD, San Francisco, CA (*Presenter*) Nothing to Disclose
Chia-Hung Sze, MS, San Francisco, CA (*Abstract Co-Author*) Researcher, ChemoFilter Inc
Jay F. Yu, MS, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Ayushi Gautam, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Prasheel Lillaney, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
David M. Wilson, MD, PhD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Anand S. Patel, MD, San Francisco, CA (*Abstract Co-Author*) Stockholder, ChemoFilter, Inc Officer, ChemoFilter, Inc
Mark W. Wilson, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Steven W. Hetts, MD, San Francisco, CA (*Abstract Co-Author*) Consultant, Silk Road Medical Inc Consultant, Medina Medical Inc Research Grant, Stryker Corporation Data Safety Monitoring Board, Stryker Corporation

PURPOSE

ChemoFilter is a novel medical device that limits systemic toxicity of chemotherapeutics by filtering non-target drug from blood that could be described as intra-vascular dialysis. This method has a potential to prevent toxicity associated with treatment of head and neck cancer, such as renal failure associated with cisplatin. We report a novel method to bind chemotherapeutics in blood that uses immobilized DNA as a platform for binding chemotherapeutics with intrinsic DNA binding activity.

METHOD AND MATERIALS

DNA binding experiments were carried out in vitro with doxorubicin in PBS solution. Genomic DNA was used to determine the concentration of DNA that shows optimum binding kinetics. Binding kinetics in nylon mesh of different pore size was evaluated.

RESULTS

DNA binding kinetics by doxorubicin is dose dependent and is very rapid with 94% decrease in drug concentration from solution within 1 minute of reaction time. DNA demonstrates faster binding kinetics by doxorubicin as compared to previously published polystyrene resin that uses ion exchange to filter doxorubicin out of the solution. DNA sequestered within the Nylon mesh demonstrates approximately 70% decrease in doxorubicin concentration from solution within 5 minutes.

CONCLUSION

DNA ChemoFilter demonstrates rapid binding of doxorubicin and is a model for filtration of DNA binding chemotherapeutics from the bloodstream.

CLINICAL RELEVANCE/APPLICATION

DNA ChemoFilter is optimized for DNA intercalating chemotherapeutics and minimizes their systemic toxicity after intra-arterial administration for treatment of liver and head and neck malignancies.

RC814-03 Repeated Transarterial Chemoocclusion with Degradable Starch Microspheres (DSMs-TACO) of Unresecable Hepatocellular Carcinoma: A Single Center Experience

Friday, Dec. 4 8:55AM - 9:05AM Location: N228

Participants
Fabrizio Chegai, MD, Rome, Italy (*Presenter*) Nothing to Disclose
Antonio Orlacchio, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Stefano Merolla, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Laura Greco, Roma, Italy (*Abstract Co-Author*) Nothing to Disclose
Elisa Costanzo, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Giovanni Simonetti, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the efficacy and safety of trans-arterialchemo-occlusion (TACO) using Degradable-Starch-Microspheres (DSMs) for unresectable hepatocellular carcinoma (HCC) treatment.

METHOD AND MATERIALS

We prospectively enrolled 28 HCC cirrhotic patients (23/5 M/F, mean age 66.3±10.5 years), to be treated with three repeated DSMs-TACO procedures (225 mg of DSMs, Embocept®S, PharmaCept and Doxorubicin Cloridrate, 50 mg/m2), performed at 4-6 week intervals. Patients were clinically evaluated before and after each procedure and disease severity scored according to Child Pugh and MELD scores. Treatment response was assessed by CT-scan 4 weeks after each procedure, according to mRECIST criteria.

RESULTS

Complete response (CR) was observed in 6 (20.8%), 11 (37.5%) and 14 (58.3%) patients after the first, second and third procedure, respectively. At the end of the treatment course all patients experienced at least a partial response. Patients with monolobar disease (16/28: 57.1%) showed higher CR rates after the first procedure compared to those with bilobar HCC (6 vs 0, p=0.017). No differences between mono or bi-lobar disease were observed in CR (64.2% vs 50%; p=ns). Eight patients (33.3%) did not complete the planned repeated procedures. In most cases treatment discontinuation was due to worsening liver function, mainly in patients with more advanced liver disease.

CONCLUSION

DSMs-TACO offers a valid therapeutic option in patients with unresecable HCC. A careful patients selection is required in order to avoid worsening liver function in patients with border-line liver compensation. Further investigations to establish the best treatment schedule and to define the effect of DSMs-TACO on survival are required.

CLINICAL RELEVANCE/APPLICATION

Temporary embolization of the hepatic artery using DSMs is feasible and safe in patients with HCC and an impaired liver function

RC814-04 Locoregional Treatment of Advanced HCC with Complete Portal Vein Thrombosis: The Impact of Radioembolization Using 90Y

Friday, Dec. 4 9:05AM - 9:15AM Location: N228

Participants
Francesco Somma, MD, Napoli, Italy (*Presenter*) Nothing to Disclose
Roberto D'Angelo, MD, Naples, Italy (*Abstract Co-Author*) Nothing to Disclose
Gianluca Gatta, Naples, Italy (*Abstract Co-Author*) Nothing to Disclose
Francesco Fiore, MD, Naples, Italy (*Abstract Co-Author*) Nothing to Disclose
Giovanni Pecoraro, Napoli, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Our purpose is to assess effectiveness and safety of Trans-arterial Radioembolization (TARE) using microspheres containing 90Y in case of advanced HCC with thrombosis of both portal branches.

METHOD AND MATERIALS

Between March 2010 and March 2013, 41 TARE were performed in 33 patients with unresectable HCC and bilirubine values up to 2.8 mg/dl. Among these, 23 had one portal branch thrombosis and 11 had thrombosis of both portal branches. Multislice Computed Tomography (MSCT) scans and angiography were used to assess the baseline burden and the follow-up studies according to the modified RECIST guideline. Some patients underwent the embolization of the Gastro-duodenal artery, using micro-coils. In these cases, a previous study was performed with the injection of TC-99MAA through a 3F microcatheter. Proton-Pump Inhibitors (PPI) were administered to prevent gastritis and ulcers.

RESULTS

The average dose administered was 1.8GBq. After the treatment, a post-embolization syndrome was found in 31/41 patients with no statistically significant difference between patients with portal thrombosis and those without. According to the RECIST guideline at least a partial response was found in 33/41 (79%) of cases three months after the procedure and in 35/41 (88%) at nine months. At two-year follow-up, patients with thrombosis of two portal branches presented survival rates similar to patients with one portal branch thrombosis, and only slightly inferior if compared to patients without thrombosis. Moreover, a retraction of portal vein thrombosis was registered in more than 60% of patients with thrombosis (21/34).

CONCLUSION

TARE showed to be a safe and effective locoregional treatment of locally advanced HCC, even in case of patients with portal vein thrombosis. Indeed, it does not worsen the post-embolization symptoms, while helping retracting portal vein thrombosis if present. Therefore, this condition not only has no impact on TARE, but represents an indication, even in case of thrombosis of both portal branches.

CLINICAL RELEVANCE/APPLICATION

If compared to patients without thrombosis, TARE in patients with HCC and portal thrombosis does not reduce the post-treatment quality of life,Thrombosis of both portal branches does not interfere with TARE, and represents one of its major indication in case of locally advanced unresectable HCC, even in case of recurrence after other locoregional treatments.

RC814-05 Irreversible Electroporation (IRE) of Malignant Liver Tumors Close to Major Portal or Hepatic Veins Does not Influence Perfusion of Hepatic or Portal Veins but Can Result in Bile Duct Strictures

Friday, Dec. 4 9:15AM - 9:25AM Location: N228

Participants
Martina Distelmaier, Aachen, Germany (*Presenter*) Nothing to Disclose
Alexandra Barabasch, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Nils A. Kraemer, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Philipp Heil, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose
Christiane K. Kuhl, MD, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Philipp Bruners, MD, Aachen, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

IRE has been proposed as a non-thermal ablation method that offers specific advantages over thermal ablation, notably absence of heat sink effect and preservation of both, blood vessels and bile ducts. The purpose of our study was to verify the theoretical advantages of IRE by systematically investigating clinical efficacy and complications of percutaneous IRE for hepatic malignancies located immediately adjacent to major portal and bile ducts or hepatic veins. We were specifically interested in the long-term patency of adjacent venous and biliary vessels.

METHOD AND MATERIALS

CT-guided percutaneous IRE of 37 primary or secondary liver malignancies (mean size 17 mm; range 7-44 mm) was performed in 27 patients (mean age 59 y; 13 men). All lesions were located immediately adjacent to major hepatic veins (n=16), portal vein branches or both (n=21) and therefore not suitable for RFA or MWA. Per standard IRE protocol, 3 to 5 probes (active tip length 1.5-2.5 cm) were placed strictly parallel under CT-guidance. All patients underwent systematic follow-up by CT or MRI.

RESULTS

No major procedure-related complications were observed. All adjacent major portal or hepatic veins remained perfused even at long term follow-up. Complete ablation of the target was achieved in 34/37 (92%) cases with a safety margin of 5-10 mm, confirmed by CT and MRI. In 9 cases (24%) local recurrences within or adjacent to the ablation zone were observed between 1-12 months after treatment. 5 patients with tumors located next to portal veins/ bile ducts (5/21=24%) developed mild to moderate segmental/lobar cholestasis, not requiring treatment. In one patient a clinically asymptomatic arterio-portal fistula developed.

CONCLUSION

IRE for primary and secondary liver malignancies located adjacent to large portal or hepatic veins proved to be safe and effective with regards to local control, and will leave venous blood vessels unaffected. Bile duct strictures may, however, occur, in up to 25% of lesions located close to portal structures.

CLINICAL RELEVANCE/APPLICATION

CT-guided IRE is a useful ablation method for primary and secondary liver tumors that are not amenable to thermal ablation (RFA, MWA). While blood vessels are preserved, bile duct stricutes do occur.

RC814-06 Y-90 Complications

Friday, Dec. 4 9:25AM - 9:40AM Location: N228

Participants
Robert J. Lewandowski, MD, Chicago, IL (*Presenter*) Advisory Board, BTG International Ltd; Advisory Board, Boston Scientific Corporation; Consultant, Cook Group Incorporated; Consultant, ABK Medical Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

RC814-07 Thermal Ablation Complications

Friday, Dec. 4 9:55AM - 10:10AM Location: N228

Participants
Ron C. Gaba, MD, Chicago, IL, (rgaba@uic.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Not applicable.

RC814-08 Debate: IO: More than Radiologists?

Friday, Dec. 4 10:10AM - 10:25AM Location: N228

Participants
Ron C. Gaba, MD, Chicago, IL, (rgaba@uic.edu) (*Presenter*) Nothing to Disclose
Robert J. Lewandowski, MD, Chicago, IL (*Presenter*) Advisory Board, BTG International Ltd; Advisory Board, Boston Scientific

Corporation; Consultant, Cook Group Incorporated; Consultant, ABK Medical Inc

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

Not applicable.

RC814-09 Incidence of Tumor Seeding after Percutaneous Radiofrequency Ablation of Hepatocellular Carcinoma: A Six Year Experience in 581 Nodules in 305 Consecutive Patients

Friday, Dec. 4 10:25AM - 10:35AM Location: N228

Participants
Somrach Thamtorawat, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Steven S. Raman, MD, Santa Monica, CA (*Abstract Co-Author*) Nothing to Disclose
Justin P. McWilliams, MD, Santa Monica, CA (*Abstract Co-Author*) Nothing to Disclose
Michael L. Douek, MD, MBA, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Simin Bahrami, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
David Y. Lu, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Tumor seeding along the needle tract or peritoneum is dreaded complication of percutaneous liver ablation, especially in potential liver transplant patients with a reported incidence up to 4.4%. Therefore, the objective of our study was to determine the incidence of tumor seeding after percutaneous RF ablation of hepatocellular carcinoma (HCC).

METHOD AND MATERIALS

With IRB approval and HIPAA compliance, our institutional clinical database was queried to access all patients who had development of one or more extrahepatic recurrences in the skin, subcutaneous tissues, or peritoneum from March 2006 to December 2012. The study cohort consisted of 305 consecutive patients (217 men and 88 women) and a total of 498 RFA sessions. All lesions were treated with single, double or cluster internally cooled straight electrodes mated to a 200W generator and switching controller (Covidien, Boulder Co) by one of four experienced interventionalists. Tract ablation was used in almost all cases. Six patients were treated by using combined ethanol injection.

RESULTS

Over a 6 year period, 581 HCC nodules were treated by RF ablation with a mean follow up of 28±16 months (range from 3-66 months). Tumor seeding was evaluated by pathological report of explant liver in 96 patients and by imaging follow up in 209 patients. During this time in two patients, single chest wall nodules were detected in or near the needle tract (0.3% per nodule, 0.6% per patient) in the setting of extrahepatic metastases. One nodule was detected at 5.3 months post ablation concurrent with lymph node metastasis. The other nodule was detected at 18.3 month after liver transplantation in a patient with concurrent lung metastases. In both cases, the ablated nodules were subcapsular, poorly differentiated on concurrent biopsy with direct electrode insertion into the nodule. There was no further lesion treatment due to advanced metastatic disease.

CONCLUSION

In this series, no needle tract seeding was detected in patients without concurrent extrahepatic metastases. However, with two solitary chest wall nodules at or near the needle tract, the possible risk of tumor seeding after RF Ablation of HCC was 0.3% per nodule and 0.6% per patient. Both nodules were poorly differentiated and subcapsular.

CLINICAL RELEVANCE/APPLICATION

Using optimal technique, there is very low risk of possible tumor seeding after percutaneous radiofrequency ablation of hepatocellular carcinoma.

RC814-10 Utility and Safety of Radiofrequency Ablation for Focal Hepatic Lesions Adjacent to Gallbladder in Ablating between GB Fossa and Contralateral Safety Margin

Friday, Dec. 4 10:35AM - 10:45AM Location: N228

Participants
In Young Choi, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Pyo Nyun Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyung Jin Won, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
So Yeon Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yong Moon Shin, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate safety and therapeutic efficacy of radiofrequency (RF) ablation for treatment of focal hepatic lesions (FHL) adjacent to gallbladder (GB) with reduction of ablation time and rearrangement of electrode.

METHOD AND MATERIALS

We restrospectively evaluated 36 patients who underwent RF ablation of FHL adjacent to GB(less than 10mm) from January 2011 to March 2014. Follow-up period was ranged from 9 to 50 months (mean, 25 months). The electrode was inserted parallel direction to GB. Patients were divided into two subgroups based on whether the lesion was abutting GB (less than 5mm, n=19) or not (more than 5mm, n=17). In abutting group, the electrode was inserted eccentrically after mesuring the diameter between GB fossa and contralateral safety margin and ablation time was decreased for reducing the diameter of ablated zone in horizontal axis to GB. Fourteen of abutting group were performed with artificial ascites (5% dextrose aqueous solution) and 8 of non-abutting group were performed with artificial ascites. A panel of radiologists blinded to the patients' clinical histories reviewed immediate follow up CT for complication and late follow up CT for local tumor progression. Statistical evaluation was performed with Chi-square test and

Fisher's exact test.

RESULTS

There were no major complications in both groups. Enhancing wall thickening of GB adjacent to RFA zone was noted in 19.4% (7/36, abutting group; 5, non-abutting group; 2) and it disappeared on subsequent follow-up imaging. There is no statistically significant difference between abutting group and non-abutting group ($p > 0.05$). The technical success rate based on immediate follow-up and one-month follow-up CT was 94.4% (34/36) and two patients remained enhancing foci on immediate follow up (1 abutting group, 1 non-abutting group) and they were retreated sucessfully. Local tumor progression of completely ablated tumors during follow-up period less than 6 months was noted in two patients (2/34, 1 abutting group, 1 non-abutting group). Except these two patients, there was no local tumor progression during follow-up periods.

CONCLUSION

RF ablation can be a safe and effective treatment for FHL adjacent to GB with rearrangement of electrode and reduction of ablation time.

CLINICAL RELEVANCE/APPLICATION

The treatment of FHL adjacent to GB is challenging issue. RF ablation may be a safe and effective treatment option even though the lesion is located right beside GB.

RC814-11 Combination Therapy Complications

Friday, Dec. 4 10:45AM - 11:00AM Location: N228

Participants
Thuong G. Van Ha, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC814-12 Complications due to Imaging Errors

Friday, Dec. 4 11:00AM - 11:15AM Location: N228

Participants
Aradhana M. Venkatesan, MD, Houston, TX, (avenkatesan@mdanderson.org) (*Presenter*) Institutional research agreement, Koninklijke Philips NV

LEARNING OBJECTIVES

View learning objectives under main course title.

ABSTRACT

RC814-13 Tumor Board-Ask the Experts

Friday, Dec. 4 11:15AM - 11:30AM Location: N228

Participants
Charles T. Burke, MD, Chapel Hill, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC814-14 Literature Review: The Most Important IO Papers from the Past 5 Years that Everyone Should Know

Friday, Dec. 4 11:30AM - 11:45AM Location: N228

Participants
Ryan Hickey, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

Handout:Ryan Hickey

http://abstract.rsna.org/uploads/2015/15002217/The Most Important IO Papers from the Past 5 years that Everyone Should Know.docx

RC814-15 Questions and Wrap-up

Friday, Dec. 4 11:45AM - 12:00PM Location: N228

Participants

RC815

The Biology of Breast Cancer

Friday, Dec. 4 8:30AM - 10:00AM Location: S406B

BR BQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC815A Breast Cancer Genomics

Participants
Cherie M. Kuzmiak, DO, Chapel Hill, NC (*Presenter*) Research Grant, FUJIFILM Holdings Corporation;

LEARNING OBJECTIVES

1) Understand the molecular classification of breast cancer and comparisont with clinical definitions. 2) Learn some of the main genomic features and clincial and treatment outcomes that stratify with the molecular subtypes.

RC815B Genetic Risk and Cancer Biology with Imaging

Participants
Elizabeth S. Burnside, MD, MPH, Madison, WI (*Presenter*) Stockholder, NeuWave Medical Inc

LEARNING OBJECTIVES

1) Understand the different types of genetic information that are being measured and used for the clinical care of breast cancer. 2) Convey that cancer development and evolution depends on both genetics and environment influences. 3) Demonstrate that imaging has the potential to better understand biology, capturing the complex combined influence of genetics and environment. 4) Illustrate the move toward personalized medicine in breast cancer and the role of imaging.

ABSTRACT

RC815C Imaging Breast Cancer Subtypes

Participants
Sheryl G. Jordan, MD, Chapel Hill, NC, (Sheryl_jordan@med.unc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Master the move beyond classifying breast cancer as DCIS, IDC, ILC, or Other/Rare. 2) Understand imaging features for four breast cancer molecular subtypes, namely luminal A, luminal B, HER2-enriched, and basal subtypes. 3) Recognize molecular subtypes' clinical patterns and outcomes in case-based presentations, to include sufficient length of patient follow-up as to reinforce prognosis.

ABSTRACT

RC816

Radiation Safety Education around the World: An International Forum (Sponsored by the Committee on International Radiology Education)

Friday, Dec. 4 8:30AM - 10:00AM Location: S404CD

ED SQ

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC816A Introduction and Overview of the Committee on International Radiology Education (CIRE)

Participants
Teresita L. Angtuaco, MD, Little Rock, AR, (angtuacoteresital@uams.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To define the role of the RSNA Committee on International Radiology Education (CIRE) in advancing radiology education through its various programs. 2) To identify opportunities for radiology education in other countries especially those with the most need. 3) To list the different educational programs administered by the CIRE, the specific areas of emphasis of each program and the qualifications of candidates.

ABSTRACT

The RSNA Committee on International Radiology Education (CIRE) administers four educational programs each targeting a different population of radiologists. The International Visiting Professor program sends a team of radiologists with different areas of expertise, based on the needs expressed by the host country. The team lectures at national radiology society annual meetings, local hospitals and teaching institutions during a two week period. The Derek Harwood Nash fellowship selects junior faculty within 10 years after completion of training from all over the world who desire to have focused training on a specific radiologic specialty in an institution chosen by the applicant. They train for 6-12 weeks in the U. S. insitution prior to returning to their countries. The Introduction to Research for Young Academics selects international residents or fellows interested in academics. They join selected residents from U.S. programs for one week of research workshops during RSNA week.. The Education Materials and Journal award program selects institutions of learning from developing or newly-developed nations to receive gratis online or print subscriptions to Radiology and RadioGraphics in addition to other materials from the RSNA Education Center. Backgound information and updated data will be provided for each program.

RC816B Africa and the Middle East

Participants
Omolola M. Atalabi, MBBS, Ibadan, Nigeria (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1)To outline the current practice of radiation safety in Africa and other developing world. 2) To outline challenges of radiation safety in developing world and 3. Suggest ways in which the existing gaps in education on radiation safety and practice can be bridged.

ABSTRACT

Abstract: No doubt imaging equipment that use radiation has contributed immensely to the care of patients and the development of different types these equipment have been so rapid over the past 100 years. The dangers inherent in the use of the equipment which are not only to patients but also to staff involved in the practice of imaging and therapy have been ignored for many decades. Aggressive advocacy for adequate education on radiation safety however began in the last few years in the developed world and rapidly gained ground and acceptance through 'Image gently and Image wisely' campaigns but the developing world have been left behind.This presentation will look at the current state of radiation education and practice vis-à-vis who is authorized to work with equipment that use and patients. What are the required type, level, frequency of training, and credentials or certifications needed. What regulatory bodies are in place both locally and nationally to ensure radiation safety practice. What empahsies are being laid on radation safety in the curriculum of medical students and residents? What is the way forward in order to bridge the gap in radiation safety education and practice between the developing and developed world.

RC816C Latin America

Participants
Renato A. Mendonca, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Demonstrate how legislation in Latin American countries prioritizes and addresses radiation protection. 2) Review how radiological societies and alliances in Latin America are organized to influence the education of other health professionals and the public.

RC816D Asia Oceania

Participants
Chamaree Chuapetcharasopon, MD, Bangkok, Thailand, (chamareec@gmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To discuss about the current situation of radiation safety practice in Asia Oceania. 2) To discuss about the current radiation safety educational programs in Asia Oceania.

ABSTRACT

Asian Oceania comprises of two continents. There are more than 70 countries in all Asian Oceania regions. The estimated population for Asia in 2014 is 4,426,683,000. The Population in Oceania is approximately 39,000,000.Despite the diversities, many activities and programs for radiation safety education have been established including many networks. This presentation will discuss on the current situation of radiation safety practice in Asia Oceania as well as current radiation safety educational programs.

RC816E Europe

Participants
Ulrich Bick, MD, Berlin, Germany, (Ulrich.Bick@charite.de) (*Presenter*) Equipment support, Hologic, Inc; License agreement, Hologic, Inc; Royalties, Hologic, Inc; Equipment support, Toshiba Corporation; Institutional research collaboration, Siemens AG

LEARNING OBJECTIVES

1) To learn about activities in radiation safety education in Europe.

RC816F Educational Initiatives in the United States

Participants
Mahadevappa Mahesh, MS, PhD, Baltimore, MD (*Presenter*) Author with royalties, Wolters Kluwer nv

LEARNING OBJECTIVES

1) To outline educational initiatives on radiation safety education in the US. 2) To list available resources and how to access radiation safety educational topics. 3) To examine how medical physicists and radiologists could coordinate efforts to improve radiation safety education.

ABSTRACT

Radiation safety can be examined from two different points of view namely, patient safety and staff safety. Radiation safety education is key in addressing the radiation protection principles in any radiology practice. Radiation safety education is part of the radiology residents training programs in the US since residents are examined on various medical physics topics including radiation safety education. Radiation safety training is also becoming part of ongoing training of interventional radiologists. This talk will focus on the various educational initiatives in the United States and the various resources available for radiation safety. This talk will also discuss on how to develop and establish radiation safety education for all those utilizing radiation.

RC816G Global Collaboration in Radiation Safety Education

Participants
Miriam N. Mikhail, MD, Geneva, Switzerland (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To outline a global collaborative development and implementation model of radiation safety education. 2) To describe the roles of and actions from international organizations and agencies in radiation safety education. 3) To list open access radiation safety education resources. 4) To examine how radiologists could improve radiation safety education.

ABSTRACT

Successful application of radiation safety principles in radiology practice is a result of teamwork and collaboration between the stakeholders. Individual experts from professional organisations develop education resources based on scientific evidence and knowledge, organisations and agencies advocate for their adoption by regulatory authorities and radiology practices, and radiologists learn from these principles and use them in practice.Professional organisations such as the International Society of Radiology, the Radiological Society of North America and United Nations agencies such as the World Health Organisation and International Atomic Energy Agency are some of the collaborators.The International Basic Safety Standards provide guidance to improve radiology practice and radiation safety. The Bonn call-for-action identified priorities to improve radiation safety in the next decade. These recommendations include the strengthening of radiation safety education and training.Many open access radiation safety education resources are available to radiologists. Radiologists play leading roles in the improvement of quality care and radiation safety through content development, training delivery and practical use of radiation safety measures and tools.

Active Handout:Miriam Niveen Mikhail

http://abstract.rsna.org/uploads/2015/15003258/Active RC816G.pdf

RC817

Molecular Imaging Beyond PET: MRI and Ultrasound/Photoacoustic Molecular Imaging

Friday, Dec. 4 8:30AM - 10:00AM Location: S504CD

MI MR OI US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants
Fabian Kiessling, MD, Aachen, Germany, (fkiessling@ukaachen.de) (*Moderator*) Advisor, invivoContrast GmbH; Co-owner, invivoContrast GmbH; Advisor, Molecular Targeting Technologies, Inc; Cooperation, Bayer AG; Cooperation, Bracco Group; Cooperation, Merck KgaA; Cooperation, AstraZeneca PLC; Cooperation, Koninklijke Philips NV; Cooperation, FUJIFILM Holdings Corporation

LEARNING OBJECTIVES

1) Attendees will learn the principles and applications of molecular imaging using ultrasound and photoacoustic imaging techniques. 2) Principles and applications of ultrasound molecular imaging will be reviewed. 3) Principles and applications of molecular imaging using photoacoustic imaging techniques will be presented. 4) Ultrasound guided drug delivery approaches will be reviewed. 5) At the end of this course, the attendees will understand the principles and potential clinical applications of ultrasound and optoacoustic molecular imaging as well as of ultrasound guided drug delivery.

Sub-Events

RC817A Photoacoustic Imaging

Participants
Stanislav Emelianov, PhD, Atlanta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the fundamental principles of photoacoustic imaging and major components of photoacoustic imaging system. 2) Knowing how photoacoustic images are formed and how to interpret photoacoustic images. 3) Understand how imaging contrast agents or imaging probes affect contrast, penetration depth and specificity in photoacoustic imaging. 4) Understand the ability of photoacoustic imaging system to visualize anatomical, functional and molecular properties of imaged tissue. 5) Identify the role of photoacoustic imaging in pre-clinical and clinical applications.

ABSTRACT

Photoacoustic imaging or tomography - a non-ionizing, non-invasive, real-time imaging technique capable of visualizing optical absorption properties of tissue at reasonable depth and high spatial resolution, is a rapidly emerging biomedical and clinical imaging modality. Photoacoustic imaging is regarded for its ability to provide in-vivo morphological and functional information about the tissue. With the recent advent of targeted contrast agents, photoacoustics is capable of in-vivo molecular imaging, thus facilitating further molecular and cellular characterization of tissue. This presentation is designed to provide both a broad overview and a comprehensive understanding of photoacoustic imaging. With a brief historical introduction, we will examine the foundations of photoacoustics, including relevant governing equations, optical/acoustic properties of the tissues, laser-tissue interaction, system hardware and signal/image processing algorithms. Specifically, penetration depth and spatial/temporal resolution of photoacoustic imaging will be anlyzed. Integration of photoacoustic and ultrasound imaging systems will be discussed. Techniques to increase contrast and to differentiate various tissues in photoacoustic imaging will be presented. Furthermore, design, synthesis and optimization of imaging probes (typically, nanoconstructs or dyes) to enable molecular/cellular photoacoustic imaging will be presented. Special emphasis will be placed on contrast agents capable of multiplexed imaging, multi-modal imaging and image-guided therapy including drug delivery and release. The presentation will continue with an overview of several commercially available and clinically-relevant systems capable of photoacoustic imaging. Regulatory aspects of photoacoustic imaging systems and imaging contrast agents will be presented. Finally, current and potential biomedical and clinical applications of photoacoustics will be discussed.

RC817B Ultrasound Molecular Imaging

Participants
Juergen K. Willmann, MD, Stanford, CA (*Presenter*) Research Consultant, Bracco Group; Research Consultant, Triple Ring Technologies, Inc; Research Grant, Siemens AG; Research Grant, Bracco Group; Research Grant, Koninklijke Philips NV; Research Grant, General Electric Company

LEARNING OBJECTIVES

1) To understand the acquisition and quantification principles of ultrasound molecular imaging. 2) To understand the characteristics and biodistribution of molecularly targeted ultrasound contrast agents. 3) To understand the role of ultrasound molecular imaging in preclinical and clinical applications.

ABSTRACT

Ultrasound imaging is a widely available, relatively inexpensive, and real-time imaging modality that does not expose patients to radiation and which is the first-line imaging modality for assessment of many organs. Through the introduction of ultrasound contrast agents, the sensitivity and specificity of ultrasound for detection and characterization of focal lesions has been substantially improved. Recently, targeted contrast-enhanced ultrasound imaging (ultrasound molecular imaging) has gained great momentum in preclinical research by the introduction of ultrasound contrast agents that are targeted at molecular markers over-expressed on the vasculature of certain diseases. By combining the advantages of ultrasound with the ability to image molecular

signatures of diseases, ultrasound molecular imaging has great potential as a highly sensitive and quantitative method that could be used for various clinical applications, including screening for early stage disease (such as cancer); characterization of focal lesions; quantitative monitoring of disease processes at the molecular level; assisting in image-guided procedures; and, confirming target expression for treatment planning and monitoring. In this refresher course the concepts of ultrasound molecular imaging are reviewed along with a discussion on current applications in preclinical and clinical research.

RC817C Sonographically-guided Drug Therapy

Participants
Alexander L. Klibanov, PhD, Charlottesville, VA, (sasha@virginia.edu) (*Presenter*) Co-founder, Targeson, Inc; Stockholder, Targeson, Inc; Institutional research collaboration, AstraZeneca PLC;

LEARNING OBJECTIVES

1) To identify the basic principles of ultrasound energy deposition as applied to molecular imaging and image-guided therapeutic interventions. 2) To combine the general physical principles of ultrasound-microbubble interaction, drug-carrier systems pharmacokinetics and ultrasound contrast imaging, apply this knowledge for the development of triggered delivery approaches in the setting of personalized medicine. 3) To understand advantages and disadvantages of ultrasound application in the potential image-guided intervention designs. 4) To identify and compare potential clinical applications of ultrasound-guided drug delivery.

ABSTRACT

The reason of ultrasound use in drug delivery is to enhance drug action specifically in the area of disease. The design of such therapeutic intervention should assure that drug deposition or action enhancement take place only in the disease site, with the general goal to improve the therapeutic index. There are several approaches to ultrasound-assisted drug delivery. The first approach, closest to clinical practice, takes advantage of existing ultrasound contrast agents (intravenous gas microbubbles approved in US for cardiac imaging). When these bubbles are co-injected intravenously with the drugs, and ultrasound energy applied to the areas of disease, localized energy deposition leads to endothelium activation or transient "softening" of blood brain barrier (BBB). Drugs (including antibodies or liposomes) can thus transit BBB and achieve therapeutic action. Ultrasound imaging can be used for targeted focusing of ultrasound energy in the areas of disease. Second approach suggests attaching microbubbles to the drug or a drug carrier (including nucleic acid drugs). Microbubbles can be complexed with drug or gene carrier nanoparticles, so that local action of ultrasound would result in triggered drug release/deposit or transfection in the ultrasound-treated area. Third approach involves targeted microbubble design, as in ultrasound molecular imaging. Combination of targeted microbubbles with drug carrier makes possible unfocused ultrasound use, to act only in the areas of the target receptor expression, where microbubbles adhere and ultrasound energy is then deposited. Lately, formulation moved from microbubbles to smaller nanodroplet drug carriers, to reach interstitium, where drug release could take place upon ultrasound treatment. Overall, combination of ultrasound imaging, including contrast (molecular) imaging, focused ultrasound, and drug carrier systems will lead to novel image-guided therapies, especially applicable in the era of personalized medicine.

RC817D Magnetic Resonance Molecular Imaging

Participants
Moritz F. Kircher, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To receive a structured overview of the fundamental principles of generating molecular information with MRI. 2) To understand how each of these principles functions and what unique information it can provide. 3) To understand the current role of molecular MRI in preclinical and clinical applications. 4) To understand what the challenges of new molecular MRI approaches towards translation into humans will be.

ABSTRACT

The field of molecular MRI has exploded in the last decade, with hundreds of different concepts and probe designs developed and tested in vitro and in vivo. This talk will attempt at giving a structured overview over this vast arsenal of potentially useful approaches by focusing on those that have the highest potential for clinical translation. The approaches will be grouped into 6 major categories and their principles explained and illustrated with key examples: 1) Multimodal nanoparticles; 2) Activatable MRI probes; 3) Targeted superparamagnetic iron oxide nanoparticles; 4) non-targeted superparamagnetic iron oxide nanoparticles; 5) MRI-based Radiogenomics; and 6) Hyperpolarized magnetic resonance spectroscopic imaging.

RC818

Global Cancer Imaging-Insights from Overseas

Friday, Dec. 4 8:30AM - 10:00AM Location: E261

GU MI MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

FDA Discussions may include off-label uses.

Participants

Sub-Events

RC818A Functional and Molecular Imaging at Oxford University

Participants
Fergus V. Gleeson, MBBS, Oxford, United Kingdom (*Presenter*) Consultant, Alliance Medical Limited; Consultant, Blue Earth Diagnostics Limited; Consultant, Polarean, Inc;

LEARNING OBJECTIVES

1) To learn about the functional and molecular imaging research being conducted within the Radiology Department of Oxford University Hospitals NHS Trust.

ABSTRACT

There is increasing functional and molecular imaging being performed in medicine. The Radiology department at the Churchill Hospital in Oxford is conducting a number of trials in these areas, and has designed these trials around interventions to measure the effect of these new techniques. It has also taken the opportunity to raise the profile of Radiology within the University, to promote greater collaboration with basic scientists, attracting increased funding, and opportunities for scientists and physicians.

RC818B Lessons Learned from the National Irish Breast Screening Program: The First 12 years-One Million Mammograms On

Participants
Michelle M. McNicholas, MD, Dublin, Ireland (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review the results of the Irish National Breast Screening Program following 12 years of screening with over 1,000,000 mammograms performed. 2) To understand the essential components of setting up and maintaining a national breast screening program in Ireland. This includes the rationale for the decisions made at the outset, such as age range, frequency of screens, centralisation of service and responsibility of the screening process to the end of primary surgery. 3) To understand the need for and the mechanism of developing a national registry of eligible women in the absence of a national unique identifier. 4) To understand the need for a client charter which sets out client guarantees, objectives and goals around issues of consent, timeliness of screening results and recall to assessment, biopsy results and admission for surgery and further treatment where indicated. 5) To understand the necessity of national guidelines, annual reports and external accreditation. 6) To demonstrate the essential need for ongoing review of key performance indicators (recall rate, biopsy rate, cancer detection rate, DCIS rate, open biopsy rate, false negative rate, interval cancer rate) as surrogates of program success. 7) To understand the importance of communication and feedback to clients, units, practitioners and media in maintaining uptake. 8) To understand the reporting structure and the composition of various roles within the multidisciplinary medical and surgical teams. 9) To understand the requirements for ongoing training and education of all staff - physicians, technologists, nurses, physicists, administrative staff. 10) To understand the factors affecting radiation dose to the screened population and the over-riding responsibility of the ALARA principle, such as: role of physics team, mammographic technique, equipment choice, technologist expertise and training, quality assessment. 11) To understand the operational issues of different screening units, double reading, discrepancy cases, dealing with interval cancers, dealing with outliers in key performance parameters. 12) To understand the positive spinoff s from the program including increased awareness, improving national standards in the screening and the symptomatic population and the contribution to improved diagnostic and treatment options. 13) To understand how the program achieved, maintained, and monitored performance and how it adapted to changes in practice as issues or controversies arose. 14) To discuss whether this population screening program has been a successful and cost effective health care initiative for Ireland. 15) Ultimately, to understand whether the Irish National Breast Screening Program has led to improved survival in women with breast cancer in Ireland.

RC818C MRI of Pelvic Malignancy-The View from Down Under

Participants
Nicholas J. Ferris, MBBS, Clayton, Australia, (nicholas.ferris@monashhealth.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn about the local availability and funding of MRI in investigating pelvic malignancy that is unique to Australia.2) To understand the current usage of Pelvic MRI in investigating pelvic malignancy in the Australian population.3) To review some typical examples of Pelvic MRI in Oncology that illustrate the advantages of MRI in the assessment of pelvic malignancies and impact MRI has on patient management in the multidisciplinary setting.

ABSTRACT

Most medical imaging tests in Australia are heavily subsidized by the Federal government as part of the 'Medicare' national health

insurance system.Prostate cancer is a common problem in Australian men, and MRI appears to be a very useful tool in its assessment and management, however it remains unfunded in the Medicare system. To remedy this, a group of clinicians has made application to the Medicare Services Advisory Committee (MSAC) for inclusion of the test on the Medicare Benefits Schedule. Steps in the recently revised MSAC procedure will be reviewed, with reference to the current application for prostate MRI.The impact of its current unfunded status on the uptake of prostate MRI will be briefly reviewed.Despite the lack of government support, there has been considerable experience with the technique 'Down Under', leading to some important publications in the international literature about the role of MRI in selection of patients for biopsy, and the choice of biopsy target.

RC818D Imaging of HCC-A Korean Perspective

Participants
Byung Ihn Choi, MD, PhD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn recent imaging techniques for the qualitative and quantitative diagnosis, selection of treatment methods, and evaluation of monitoring after treatment for HCC. 2) To understand the imaging findings of hepatocarcinogenesis from regenerate nodule going through low and high grade dysplastic nodule, early HCC and finally to advanced HCC. 3) To review current clinical practice guidelines including role of imaging for the diagnosis and treatment for HCC with focus on recent change of guidelines by rapid progression of imaging biomarkers.

ABSTRACT

RC821

Medical Physics 2.0: Fluoroscopy

Friday, Dec. 4 8:30AM - 10:00AM Location: S405AB

PH IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.00

Participants
Ehsan Samei, PhD, Durham, NC (*Director*) Nothing to Disclose
Douglas E. Pfeiffer, MS, Boulder, CO (*Director*) Nothing to Disclose

Sub-Events

RC821A Fluoroscopy Perspective

Participants
Ehsan Samei, PhD, Durham, NC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To become familiar with major trends in fluoroscopy technology. 2) To understand transitions in technology that requires new and advanced evaluations. 3) To appreciate how a medical physicist is to effectively engage with clinical practice.

ABSTRACT

Just like other medical imaging modalities, fluoroscopy has been undergoing a number of technological transitions. Those include transitions from II to flat panel detectors and from 2D to 3D imaging. While these advances offer improvements and new possibilities, they challenge the conventional way a system is to be tested. In addition, given the interventional nature of the modality, there is an increasing need for the medical physicist to be more operationally engaged with the use and optimization of the technology. This lecture aims to offer a historical perspective on these topics and an outline of major priorities for fluoroscopic physics service.

RC821B Fluoroscopy 1.0

Participants
Beth A. Schueler, PhD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review basic fluoroscopy imaging system performance evaluation tests. 2) Compare measurement procedures for fluoroscopic exposure assessment. 3) Become familiar with test procedures designed to assess fluoroscopic image quality. 4) Learn about implementation of patient dose management processes for fluoroscopic procedures.

ABSTRACT

This segment will provide a review of customary medical physics support activities for fluoroscopic imaging systems. Quality control testing procedures for image quality evaluation, radiation dose measurement and other mechanical performance characteristics are essential for optimizing equipment performance and ensuring patient and staff safety. Test equipment, phantoms, measurement methods and recommended performance criteria for these tests will be summarized as they apply to different types of fluoroscopic equipment, from angiographic imaging systems to radiographic-fluoroscopic (RF) tables and mobile C-arms. In addition, the medical physicist's role in clinical implementation of fluoroscopic systems will be discussed, including ensuring appropriate configuration of anatomical program settings, recommendations for patient dose management and methods for patient dose estimation.

Active Handout:Beth A. Schueler

http://abstract.rsna.org/uploads/2015/13010881/RC821.pdf

RC821C Fluoroscopy 2.0

Participants
Keith J. Strauss, FAAPM, FACR, Cincinnati, OH (*Presenter*) Research Consultant, Koninklijke Philips NV; Speakers Bureau, Koninklijke Philips NV

LEARNING OBJECTIVES

1) Understand need for and advantages of quantitative (as opposed to qualitative) analysis of image quality. 2) Identify and understand new tools becoming available for evaluating fluoroscopic equipment performance. 3) Identify appropriate configuration of acquisition parameters as a function of patient size. 4) Be able to configure the radiation dose to the detector to ensure diagnostic image quality at properly managed patient dose.

ABSTRACT

AbstractSteps that are required to turn physics support of fluoroscopy from a compliance focused to operationally focused program will be discussed. New metrics and analytics to better quantify high contrast resolution, low contrast resolution, temporal resolution, and 3D imaging will be examined. Changes in testing protocols necessary to address new hardware technologies, new acquisition methods, state-of-the-art image processing and analysis will be reviewed. A recently developed "physics testing mode" that the vendors will provide in the near future will be described. Proper management of patient dose metrics will be reviewed.The presentation concludes with clinical implementation of these new strategies. Proper training and communication is critical. Proper

configuration of acquisition parameters (focal spot size, voltage and added filter, tube current, pulse width, pulse rate, scatter removal) as a function of patient size from the smallest neonate to the largest bariatric patient is key to providing diagnostic image quality at properly managed radiation doses. In addition, one must ensure that the detector dose as a function of filter type and thickness, pulse rate, field of view, and complexity of the examination is properly configured.

Active Handout:Keith Jerel Strauss

http://abstract.rsna.org/uploads/2015/13010882/Active RC821C.pdf

RC823

ABR Maintenance of Certification for Medical Physicists

Friday, Dec. 4 8:30AM - 10:00AM Location: E263

ED OT PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
G. Donald Frey, PhD, Charleston, SC, (dfrey@theabr.org) (*Director*) Nothing to Disclose

Sub-Events

RC823A MOC Requirements

Participants
G. Donald Frey, PhD, Charleston, SC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The learner will be able to prepare for the 2016 lookback. 2) The learner will understand the nature of the cognitive exam. 3) The learner will be able to use the changes in the MOC program.

ABSTRACT

The ABR MOC process has been in place for more than a decade. The process requires for elements. This presentation will review the four elements with an emphasis on some recent enhancements. Several years ago the ABR replaced the time limited certificates with a 'continuous certification' process. Continuous certification is based on an annual 'lookback.' The first complete lookback will be in March of 2016. This presentaion will help medical physicists be ready for the 2016 lookback.

RC823B PQI Projects

Participants
Jerry D. Allison, PhD, Augusta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The learner will understand the context of and purpose for Performance Quality Improvement (PQI). 2) The learner will understand the "Plan, Do, Study, Act" PQI cycle. 3) The learner will understand requirements for PQI projects. 4) The learner will understand types of PQI projects.

ABSTRACT

Practice Quality Improvement (PQI) is a key element of the ABR MOC continuous certification process. This presentation will review the framework for PQI including the "Plan, Do, Study, Act" cycle for PQI project cycles, PQI project requirements, types of PQI projects and PQI project documentation.

Active Handout:Jerry D. Allison

http://abstract.rsna.org/uploads/2015/15002856/RC823 Allison (1).pdf

RC823C The MOC Cognitive Exam

Participants
J. Anthony Seibert, PhD, Sacramento, CA, (jaseibert@ucdavis.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) The learner will identify the content of the MOC cognitive exam for each of the specific Medical Physics disciplines (Therapy Medical Physics, Diagnostic Medical Physics, Nuclear Medical Physics). 2) The learner will understand the percentage of fundamental and current clinical question topics and how the exam is assembled. 3) The learner will know how to prepare for the examination based on reference materials used in developing questions, and when to consider taking the exam within the 10 year MOC cycle.

ABSTRACT

Part 3 of the MOC 'Continuous Certification' policy represents the Cognitive Expertise component for participating diplomates of the American Board of Radiology, and is required to maintain the ongoing validity of the certificate (except for lifetime certificate holders). In order to fulfill this requirement, the Diplomate must pass the MOC cognitive exam within the past 10 years. The content of the exam is 30 percent fundamental core questions and the remainder represents recent advances in the field for each of the Medical Physics disciplines.Exams are offered each year at a testing center and can be taken at any time during the MOC process. The Diplomate must take an exam in each discipline in which certification is being maintained. Details of the exam, its content, any study guides useful for preparing for the exam are discussed.

RC824

Forensic Radiology: Preparing Cases for the Court Room (An Interactive Session)

Friday, Dec. 4 8:30AM - 10:00AM Location: E353A

OT

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Angela D. Levy, MD, Washington, DC (*Moderator*) Nothing to Disclose
Howard T. Harcke, MD, Dover AFB, DE, (howard.harcke@gmail.com) (*Presenter*) Nothing to Disclose
Barry D. Daly, MD, Baltimore, MD, (bdaly@umm.edu) (*Presenter*) Research Grant, Koninklijke Philips NV
David Fowler, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Edward L. Mazuchowski, MD, PhD, Dover AFB, DE (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the strengths and limitations of the imaging techniques used in forensic radiology. 2) Explain how the courtroom use of imaging findings assists expert witnesses such as forensic pathologists or radiologists. 3) Compare the role of the radiologist and forensic pathologist in preparing cases for the courtroom. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

ABSTRACT

Radiography, CT, CT angiography, and MRI are routinely used in forensic radiology. These are widely accepted imaging techniques that are becoming important diagnostic tools for forensic pathologists. Increasingly, CT and MRI images are being used to provide evidence in the courtroom and the radiologist and pathologist must appreciate how imaging findings may be complementary to or more sensitive than autopsy findings. Imaging findings provide additional objective evidence that can be easily displayed. In some cases, forensic imaging may support evidence from accident or crime scene investigations or may be the sole finding to support a theory for the mechanism and cause of injury or death. Such studies may influence jury members and contribute in securing either a criminal conviction or acquittal where appropriate.In this course, radiologists are paired with a forensic pathologist to discuss cases that they typically encounter in practice. The cases will be presented to the audience in a systematic manner with imaging and autopsy findings to teach the audience how imaging is used in the court to supplement the testimony of the medical examiner or expert radiologist. Examples include the meaning of hyoid fracture in strangulation; assessment of perforating gunshot wounds; the significance of intravascular air; and, the appearance of stillbirth versus live birth in infant death.

RC825

Radiomics Mini-Course: Informatics Tools and Databases

Friday, Dec. 4 8:30AM - 10:00AM Location: S404AB

BQ IN PH

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Sandy Napel, PhD, Stanford, CA (*Director*) Medical Advisory Board, Fovia, Inc; Consultant, Carestream Health, Inc; Scientific Advisor, EchoPixel, Inc

LEARNING OBJECTIVES

ABSTRACT

Sub-Events

RC825A The Role of Challenges and Their Requirements

Participants
Jayashree Kalpathy-Cramer, MS, PhD, Charlestown, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the role of challenges and benchmarks in image analysis, radiomics and radiogenomics. 2) Learn about challenge infrastructure and requirements to host and participate in challenges. 3) Learn about past and upcoming challenges that focus on topics in radiology, radiomics and radiogenomics.

ABSTRACT

Challenges and benchmarks have been used successfully in a number of scientific domains to make signfiicant advances in the field by providing a common platform for collaboration and competition. By provide a common dataset and common set of evaluation metrics, they also facilitate a fair and rigorous evaluation of algorithms. Challenge organizers often sequester the test data from the training data, further enhancing the rigor of the evalation. These efforts can introduce problems in medical imaging to experts in other domains such as image processing and machine learning and serve as a means to bring in to medical images a range for expertise from other domains. They also serve to allow computer scientists access to clinical data which they may not otherwise have. Many challenges have also highlighted the need for collaboration as the best results are often obtained by combining a range of complementary techniques. We will discuss recent challenges from a number of domains including imaging and bioinformatics, explore the informatics infrastructure to host and participate in challenges and discuss the needs for future challenges including those in radiomics and radiogenomics.

RC825B Quantitative Image Analysis Tools: Communicating Quantitative Image Analysis Results

Participants
Andriy Fedorov, PhD, Boston, MA, (andrey.fedorov@gmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the meaning and importance of interoperability for quantitative image analysis tools. 2) Review specific use cases motivating standards-based interoperable communication of the analysis results. 3) Learn about free open source tools that can facilitate interoperable communication of analysis results using DICOM standard.

ABSTRACT

Quantitative imaging holds tremendous but largely unrealized potential for objective characterization of disease and response to therapy. Quantitative imaging and analysis methods are actively researched by the community. Certain quantitation techniques are gradually becoming available both in the commercial products and clinical research platforms. As new quantitation tools are being introduced, tasks such as their integration into the clinical or research enterprise environment, comparison with similar existing tools and reproducible validation are becoming of critical importance. Such tasks require that the analysis tools provide the capability to communicate the analysis results using open and interoperable mechanisms. The use of open standards is also of utmost importance for building aggregate community repositories and data mining of the analysis results. The goal of this course is to build the understanding of the interoperability as applied to quantitative image analysis, with the focus on clinical research applications.

Handout:Andriy Fedorov

http://abstract.rsna.org/uploads/2015/15003220/rc825fedorov.pdf

RC825C Public Databases for Radiomics Research: Current Status and Future Directions

Participants
Justin Kirby, Bethesda, MD (*Presenter*) Stockholder, Myriad Genetics, Inc

LEARNING OBJECTIVES

1) Understand the importance of using digital object identifiers and public databases to facilitate reproducible radiomics research. 2) Become familiar with publicly available databases where you can. a) download existing radiomic and radiogenomic data sets. b) request to upload new radiomic/radiogenomic data sets. 3) Learn about new data-centric journals which help enable researchers to receive academic credit for releasing well-annotated data sets to the public.

ABSTRACT

Lack of reproducibility in scientific research, particularly in healthcare, has become an increasing issue in recent years. The National Insitutes of Health (NIH) and many major publishers have since called for increased sharing of raw data sets so that new findings can be easily validated in a transparent way. This is especially important in the emerging field of radiomics where large data sets and huge numbers of image features lead to an increased risk of spurious correlations which are not actually driven by biology. A number of public databases have since been created by governments and other organizations to help facilitate the sharing of data sets. Publishers have developed new 'data journals' and services specifically designed to encourage researchers to annotate and share their data sets. It is now up to the imaging research community to begin taking advantage of these resources. Other disciplines such as genomics and proteomics are significantly leading imaging in the adoption of these new open-science workflows. Significant engagement with NIH and other organizations providing open databases and related services is critical to enabling imaging researchers to successfully shift to a culture of data sharing and transparency.

RC827

Comparative Effectiveness: New Research Agendas for New Economic Times

Friday, Dec. 4 8:30AM - 10:00AM Location: S501ABC

HP

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Coordinator*) Nothing to Disclose
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Moderator*) Nothing to Disclose
Mitchell D. Schnall, MD, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Jeffrey G. Jarvik, MD, MPH, Seattle, WA (*Presenter*) Co-founder, PhysioSonics, Inc; Stockholder, PhysioSonics, Inc; Intellectual property, PhysioSonics, Inc ; Consultant, HealthHelp, LLC; Author, Springer Science+Business Media Deutschland GmbH; Advisory Board, General Electric Company; Consultant, Alphabet Inc
Larry G. Kessler, Seattle, WA (*Presenter*) Consultant, Nucleix, Ltd; Consultant, MagForce AG

Honored Educators

Presenters or authors on this event have been recognized as RSNA Honored Educators for participating in multiple qualifying educational activities. Honored Educators are invested in furthering the profession of radiology by delivering high-quality educational content in their field of study. Learn how you can become an honored educator by visiting the website at: https://www.rsna.org/Honored-Educator-Award/

Mitchell D. Schnall, MD, PhD - 2013 Honored Educator

RC829

Body MRI: Clinical Challenges (An Interactive Session)

Friday, Dec. 4 8:30AM - 10:00AM Location: E450A

GI GU MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC829A Imaging Perianal Fistulae

Participants
Damian J. Tolan, MBBCh, FRCR, Leeds, United Kingdom, (damian.tolan@nhs.net) (*Presenter*) Speaker, Bracco Group; Speaker, Merck & Co, Inc

LEARNING OBJECTIVES

1) To understand how to describe the different types of fistula. 2) To learn how to perform, interpret and report MRI for the initial assessment of fistula in ano. 3) To learn the implications of MR findings in planning surgical treatment.

RC829B Pelvic Endometriosis

Participants
Evan S. Siegelman, MD, Philadelphia, PA (*Presenter*) Consultant, BioClinica, Inc; Consultant, ICON plc; Consultant, ACR Image Metrix

LEARNING OBJECTIVES

1) Review the theories concerning the pathogenesis of endometriosis. 2) Discuss the clincial indications that may indicate the use of pelvis imaging to diagnose endometriosis. 3) Assess the current MR techniques used in the detection and characterization of endometriosis. 4) Describe the imaging features of endometriomas and deeply infiltrative endometriosis.

ABSTRACT

Endometriosis is defined as the presence of ectopic endometrial glands and stroma outside the uterus. Endometriosis is a common cause of pelvic pain and infertility, affecting as many as 10% of premenopausal women. Radiologists should be familiar with the various imaging manifestations of endometriosis, especially those that allow its differentiation from other pelvic lesions. The MR 'pearls' offered here apply to the detection and characterization of pelvic endometriosis. The inclusion of T1-weighted fat-suppressed sequences is recommended for all MR examinations of the female pelvis because such sequences facilitate the detection of small endometriomas and aid in their differentiation from mature cystic teratomas. Benign endometriomas can exhibit restricted diffusion and should not be confused with ovarian cancer. Although women with endometriosis are at risk for developing clear cell and endometrioid epithelial ovarian cancers (ie, endometriosis-associated ovarian cancers), imaging findings such as enhancing mural nodules should be confirmed before a diagnosis of ovarian malignancy is suggested. The presence of a dilated fallopian tube, especially one containing hemorrhagic content, is often associated with pelvic endometriosis. Deep (solid infiltrating) endometriosis can involve the pelvic ligaments, anterior rectosigmoid colon, bladder, uterus, and cul-de-sac, as well as surgical scars; the lesions often have poorly defined margins and T2 signal hypointensity as a result of fibrosis. The presence of subcentimeter foci with T2 hyperintensity representing ectopic endometrial glands within these infiltrating fibrotic masses may help establish the diagnosis.

Honored Educators

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Evan S. Siegelman, MD - 2013 Honored Educator

RC829C Cholangiocarcinoma Diagnosis and Staging: What the Surgeon Needs to Know

Participants
Eduard E. De Lange, MD, Charlottesville, VA, (delange@virginia.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn about staging cholangiocarcinoma. 2) To understand how the tumor is classified surgically. 3) To get insight into the various surgical procedures for tumor resection. 4) To understand the importance of vascular involvement for determining tumor resectability.

ABSTRACT

Active Handout:Eduard E. De Lange

http://abstract.rsna.org/uploads/2015/15002799/RC829C.pdf

Handout:Eduard E. De Lange

http://abstract.rsna.org/uploads/2015/15002799/Course RC829C- de Lange EE - Cholangiocarcinoma - What the surgeon needs to

know.xps

RC831

Tumor Ablation beyond the Liver: Practical Techniques for Success

Friday, Dec. 4 8:30AM - 10:00AM Location: S403A

GI IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Debra A. Gervais, MD, Chestnut Hill, MA (*Moderator*) Nothing to Disclose
Terrance T. Healey, MD, Providence, RI (*Presenter*) Nothing to Disclose
Anil N. Kurup, MD, Rochester, MN, (kurup.anil@mayo.edu) (*Presenter*) Nothing to Disclose
Muneeb Ahmed, MD, Wellesley, MA, (mahmed@bidmc.harvard.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Gain knowledge as to how to approach tumor ablation in extrahepatic sites. 2) How to avoid and manage organ specific complications. 3) Review results of tumor ablation in the lung, kidney, and bone.

ABSTRACT

Pulmonary malignancies, and specifically lung cancer, are a leading cause of death worldwide. Utilization of best current therapies results in an overall five-year relative survival rate for all stages combined to be only 15%, necessitating the use of alternative therapies. Image-guided ablation of lung malignancies is a revolutionary concept whose clinical applications are just beginning to be developed. It has some advantages over traditional radiotherapy and chemotherapy. Its safety profile is similar to percutaneous image guided lung biopsy. Almost all image-guided ablative procedures can be performed in an outpatient setting, mostly with conscious sedation. Multiple applications can be performed without any additional risks. Contraindications are few and include uncontrollable bleeding diathesis and recent use of anticoagulants. Image-guided ablation of lung malignancies is performed with two basic rationales. In the first group it is used with an intention of achieving definitive therapy. These are patients who are not candidates for surgery because of co-morbid medical contraindications to surgery, like poor cardiopulmonary reserve or patients refusing to undergo operation. This cohort could potentially derive significant benefit form a minimally invasive alternative therapy. In the second group it is used as a palliative measure as follows: (a) to achieve tumor reduction before chemotherapy (b) to palliate local symptoms related to aggressive tumor growth, such as chest pain, chest wall pain or dyspnea (c) hematogenous painful bony metastatic disease (d) tumor recurrence in patients who are not suitable for repeat radiation therapy or surgery Image-guided ablation is expanding treatment options for the local control of non-small cell lung cancer and metastatic disease.

RC832

Mentoring Future Leaders

Friday, Dec. 4 8:30AM - 10:00AM Location: S403B

ED LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC832A Considerations and Suggested Approaches to Implementing Formal Mentoring

Participants
Alexander M. Norbash, MD, Boston, MA (*Presenter*) Co-founder, Boston Imaging Core Laboratories, LLC;

LEARNING OBJECTIVES

1) To recognize and describe process and system-based approaches to implementing formal mentoring. 2) To understand the strengths and limitations of system-based mentoring systems.

ABSTRACT

This presentation will include three presenters describing their experiences with mentoring, as distinct from coaching and advising. A mentoring relationship includes an experirenced individual possessing generativity and experience, and also a receptive advisee who values the contributions of the mentor in facilitating the advisees success. Many organizations have attempted to create formal mentoring systems with varying degrees of succcess. The three portions of this presentation will focus on processes and systems that can be implemented in creating a formal mentoring system, along with benefits and limitations of the same. A second portion will focus on the complex balancing interplay between mentors, advisees, and the goals of the mentoring engagement. The third portion will specifically focus on best mentoring practices for success in healthcare.

RC832B Mentoring, Mentors and Goals: A Balancing Act

Participants
James V. Rawson, MD, Augusta, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize elements of mentoring relationship that should be defined and agreed to. 2) Understand balancing trade-offs in mentoring relationships.

ABSTRACT

The choice of a mentor and a mentoring relationship can be a critical step in professional development. The relationship is a balance of self-discovery, guided development and occasional intervention/rescue. Expectations and responsibilities of both the mentor and the mentee should be defined and agreed to. The author will describe approaches that are helpful in recognizing and balancing trade-offs in a mentoring relationship.

RC832C Mentoring and Your Career: Best Practices for Success in Health Care

Participants
Frank J. Lexa, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the proper role of mentoring in your career. 2) Analyze best practices of mentoring. 3) Become a better mentor and mentee.

RC850

Image-guided Biopsy of the Spine (Hands-on)

Friday, Dec. 4 8:30AM - 10:00AM Location: E260

MK NR IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
John L. Go, MD, Los Angeles, CA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) Discuss and demonstrate spine biopsy techniques including CT and fluoroscopic approaches, anatomic landmarks, needle selection, special technical considerations for dealing with soft tissue masses, and fluid accumulations, lytic and blastic lesions, and hypervascular conditions. 2) Hands on exposure will be provided in order to familiarize participants with the vast number of biopsy devices that are clinically available. 3) Training models will also be used in order to teach technical skills with respect to approach and technique. 4) Advantages and disadvantages of various biopsy devices and techniques, and improve their understanding of how to maximize the reliability and safety of these spine biopsy procedures.

ABSTRACT

Sub-Events

RC850A Pre- and Post Biopsy Assessment

Participants
Richard Silbergleit, MD, Royal Oak, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be familiar with all required aspects of the pre-biopsy work-up, including medications, laboratory values, and review of relevant prior imaging. 2) Be familiar with solutions to address to complications or other unexpected events which may arise during the course of spine biopsy. 3) Be comfortable in performing the post procedure assessment of the patient after spinal biopsy.

RC850B Equipment Used for Image-guided Biopsies of the Spine

Participants
Michele H. Johnson, MD, New Haven, CT (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Demonstrate the types of needles used for spine biopsy. 2) Selecting the proper types of needles used for spine biopsy. 3) Case demonstration of the proper use of single or coaxial needle sets for spine biopsy and the advantages or disadvantages of each.

RC850C Thoracic and Lumbar Biopsies

Participants
John L. Go, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the anatomy of the thoracic and lumbar spine relevant to spine biopsy. 2) Describe the approaches used to approach various anatomical regions within the thoracic and lumbar spine. 3) Provide case examples of various approaches used to biopsy the thoracic and lumbar spine.

ABSTRACT

RC850D Cervical Spine Biopsies

Participants
A. Orlando Ortiz, MD, MBA, Mineola, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Demonstrate the various approaches used to biopsy lesions of the cervical spine. 2) Determine the selection of the proper needles to use to biopsy the spine. 3) Provide case examples of cervical biopsies and the thought process used to perform these procedures.

ABSTRACT

Cervical spine biopsies can be challenging procedures to perform, hence they tend to be performed by a limited number of proceduralists. C-spine biopsy is often performed to evaluate potential neoplastic or infectious processes of the cervical spine. The key to performing these procedures effectively and safely is in appropriate patient selection, careful image analysis in order to properly position the patient and choose an approach, identification of critical structures (such as the carotid artery) and neck spaces that should be avoided, and use of coaxial biopsy techniques. The procedure can be safely performed with CT and/or CT fluoroscopy. Specimen sampling principles and specimen handling are also discussed they can help to optimize this procedure.

RC850E Disc Biopsy and Aspiration

Participants
Amish H. Doshi, MD, New York, NY, (amish.doshi@mountsinai.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

RC851

Imaging in Practice: DWI in the Abdomen and Pelvis

Friday, Dec. 4 8:30AM - 10:00AM Location: S406A

GI GU MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Sub-Events

RC851A How to Perform DWI - Principles and Protocol

Participants
Shreyas S. Vasanawala, MD, PhD, Palo Alto, CA (*Presenter*) Research collaboration, General Electric Company; Consultant, Arterys; Research Grant, Bayer AG;

LEARNING OBJECTIVES

1) Understand basic principles of contrast formation in diffusion weighted MRI. 2) Understand sources of artifacts in diffusion weighted MRI. 3) Know techniques to reduce artifacts to produce diagnostic quality diffusion weighted images.

ABSTRACT

Diffusion-weighted imaging is being used with increasing frequency in body MRI. The basic mechanism of contrast generation is the use of large motion-sensitizing gradients such that water molecules undergoing random motion are dephased, resulting in signal loss. Tissues and lesions with high cellularity have reduced diffusive motion of water, which results in relatively high signal. However, a number of issues make diffusion-weighted imaging in the body challenging relative to neurological applications. First, the vast majority of clinical DWI is performed with an echo-planar technique, which suffers from image distortions due to field inhomogeneity. These become problematic particularly where there are gas-tissue interfaces, such as at the dome of the liver and near gas-filled bowel. The presentation will discuss methods to minimize these distortions. Second, the T2 relaxation rates of abdominal tissues are less than that of pelvic viscera and much less than that of the brain, whereas normal water diffusivity is higher; as the choice of diffusion sensitivity (b value) heavily influences the echo time, lower b values must be used. Third, motion from cardiac pulsations, respiration, and peristalsis produce artifacts, some of which are easily recognizable, and others which can subtly hide pathology. Techniques to minimize these pitfalls will be presented. Finally, issues of reproducibility that affect the practical clinical use of DWI for lesion characterization in body MRI will be discussed, along with approaches to improve reliability.

RC851B Interpretation of DWI - How to Create and Use ADC Maps in Your Practice

Participants
Thomas A. Hope, MD, San Francisco, CA, (thomas.hope@ucsf.edu) (*Presenter*) Advisory Committee, Guerbet SA; Research Grant, General Electric Company

LEARNING OBJECTIVES

1) Understand the principles of calculating ADC. 2) Understand the effect of b-value selection and weighting on diffusion calculations. 3) Explore the value of IVIM and other parameters.

ABSTRACT

In order to incorporate diffusion weighted imaging into clinical practices, it is important to understand how diffusion data is evaluated. Qualitatively, one can simply say that lesions are "bright" on diffusion, but intensity on high b-value imaging is not always equal to a lesion that has reduced diffusion. The understanding and implementation of quantitative analysis is therefore critical for both research and everyday clinical practice. The first step is the calculation of the apparent diffusion coefficient (ADC) map, which is used to help tease out the differences in intrinsic T2 hyperintensity and diffusivity. The calculation of the ADC map is greatly affected by the methodology used as well as the selection of b-values acquired. The ADC of a tissue describes how quickly signal decreases as the b-value is increased. Those lesions with high diffusivity will have high ADC values, while those lesions with reduced diffusion will have lower ADC values. In addition to ADC, other parameters have been describe that affect the measured diffusivity. The most commonly discussed is intravoxel incoherent motion (IVIM) that is thought to represent the random movement of blood within the capillary system, often called pseudodiffusion. This parameter has its greatest effect on diffusion weighted images at low b-values.

URL

RC851C Applications of DWI in Clinical Practice - When It Does and Doesn't Help

Participants
Frank H. Miller, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Demonstrate the utility of diffusion weighted imaging in the abdomen. 2) Show advantages and limitations of diffusion weighted imaging in the abdomen.

ABSTRACT

Diffusion weighted imaging (DWI) has been used in neuroimaging for many years. It has only more recently become feasible in the abdomen. The objective of this talk is to emphasize the important role that diffusion-weighted imaging can have in your practice

and that it can be used routinely without difficulty in the abdomen and pelvis. DWI potentially can detect additional lesions and direct the radiologist to lesions that are not as well seen on conventional imaging. DWI helps in characterization of lesions but does have limitations in specificity which will be discussed. Qualitative and quantitative evaluation can be performed and the applications of these techniques clinically will be described. The strengths and limitations of DWI in multiple organs including the liver, pancreas, adrenal gland, kidney, and evaluation for metastases and infections will be discussed. DWI is especially helpful for identify lymph node and peritoneal metastases. Emerging techniques include the use of diffusion weighted imaging to assess response to therapy following liver-directed therapy will also be discussed. In summary, DWI should be used routinely if not being used at your institution. This talk will show benefits and limitations of DWI in a number of organs in the body.

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Frank H. Miller, MD - 2012 Honored Educator
Frank H. Miller, MD - 2014 Honored Educator

RC852

US-guided Interventional Breast Procedures (Hands-on)

Friday, Dec. 4 8:30AM - 10:00AM Location: E264

BR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants

Gary J. Whitman, MD, Houston, TX (*Moderator*) Book contract, Cambridge University Press
Annamaria Wilhelm, MD, Jacksonville, FL (*Presenter*) Nothing to Disclose
Michael N. Linver, MD, Albuquerque, NM (*Presenter*) Scientific Advisory Board, Hologic, Inc; Scientific Advisory Board, Real Imaging Ltd
Stamatia V. Destounis, MD, Scottsville, NY (*Presenter*) Research Grant, FUJIFILM Holdings Corporation; Research Grant, Hologic, Inc; Research Grant, QT Ultrasound LLC
Anna I. Holbrook, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Alice S. Rim, MD, Cleveland, OH, (rima@ccf.org) (*Presenter*) Nothing to Disclose
Alda F. Cossi, MD, Boston, MA (*Presenter*) Nothing to Disclose
Eren D. Yeh, MD, Boston, MA, (eyeh@partners.org) (*Presenter*) Nothing to Disclose
Gary W. Swenson, MD, Mason City, IA (*Presenter*) Nothing to Disclose
Catherine W. Piccoli, MD, Voorhees, NJ (*Presenter*) Stockholder, VuCOMP, Inc;
Michael P. McNamara JR, MD, Cleveland, OH, (mpm9@case.edu) (*Presenter*) Nothing to Disclose
Selin Carkaci, MD, Columbus, OH (*Presenter*) Author with royalties, Reed Elsevier
Jean M. Seely, MD, Ottawa, ON (*Presenter*) Nothing to Disclose
Phan T. Huynh, MD, Houston, TX (*Presenter*) Research Grant, Siemens AG; Consultant, Siemens AG
Basak E. Dogan, MD, Houston, TX (*Presenter*) Nothing to Disclose
Jiyon Lee, MD, New York, NY, (jiyon.lee@nyumc.org) (*Presenter*) Nothing to Disclose
Tanya W. Moseley, MD, Houston, TX (*Presenter*) Nothing to Disclose
Michelle D. McDonough, MD, Jacksonville, FL, (McDonough.michelle@mayo.edu) (*Presenter*) Nothing to Disclose
Peter R. Eby, MD, Seattle, WA, (peter.eby@virginiamason.org) (*Presenter*) Consultant, Devicor Medical Products, Inc
William R. Poller, MD, Pittsburgh, PA (*Presenter*) Consultant, Devicor Medical Products, Inc;
Alexis V. Nees, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe the equipment needed for ultrasound guided interventional breast procedures. 2) Review the basic principles of ultrasound guidance and performance of minimally invasive breast procedures. 3) Practice hands-on technique for ultrasound guided breast interventional procedures.

ABSTRACT

This course is intended to familiarize the participant with equipment and techniques in the application of US guided breast biopsy and needle localization. Participants will have both basic didactic instruction and hands-on opportunity to practice biopsy techniques on tissue models with sonographic guidance. The course will focus on the understanding and identification of: 1) optimal positioning for biopsy 2) imaging of adequate sampling confirmation 3) various biopsy technologies and techniques 4) potential problems and pitfalls

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Eren D. Yeh, MD - 2015 Honored Educator

RC853

Workflow Tools to Optimize Departmental Operations

Friday, Dec. 4 8:30AM - 10:00AM Location: E352

IN LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Bradley J. Erickson, MD, PhD, Rochester, MN (*Moderator*) Stockholder, Evidentia Health, Inc; Stockholder, OneMedNet Corporation; Stockholder, VoiceIt Technologies, LLC

LEARNING OBJECTIVES

1) Become familiar with workflow technologies that are available and being used in other industries. 2) See how workflow terminologies can be applied in practice. 3) See how workflow engines have been applied in radiology.

ABSTRACT

Workflow is a critical element of safe and efficient practices. Workflow is usually supported by using relational databases, which tends to force a linear workflow into practice. SQL queries are also not optimal for detecting and handling error conditions.Workflow engines are used in other industries for exactly those reasons--they help enforce an agreed upon optimal pathway of events, and make it easy and clear how to deal with error and exception conditions. While they have been applied in healthcare, those experiments have usually failed because the implementation did not handle error conditions well, and did not completely model the richness and complexity of healthcare. Radiology tends to be more straightforward, and may be a good area to use workflow engines. In this session, we will describe one implementation in a clinical practice, as well as use in research and clinical trials.As we have begun to use workflow engines, it became apparent that agreeing on the names for key steps in the workflow would be helpful. Such a common lexicon would help us to assure that workflow was done in the same way in different locations. It could also allow us to measure the efficiency of workflows. This latter aspect was perceived to be of great value to practices accross the world, and led to the creation of the SIIM Workflow Initiative in Medicine (SWIM) lexicon, which is now a part of RadLEX. The basic concepts of SWIM and its connection toe IHE and the practice will be described.

Sub-Events

RC853A Managing Your Department with Workflow Engines

Participants
Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Stockholder, Evidentia Health, Inc; Stockholder, OneMedNet Corporation; Stockholder, VoiceIt Technologies, LLC

LEARNING OBJECTIVES

1) Become familiar with workflow engine technology. 2) Understand how workflow engines can be used within a radiology department. 3) Understand strengths and weaknesses of workflow engines compared to alternative methods like databases.

ABSTRACT

Workflow engines are used in a variety of industries because they can improve efficiency and quality. The same is true for radiology. Workflow engines can help assure that we routinely apply the optimal algorithms and processing steps for best quality care. They can also assure that things don't 'fall through the cracks'. Finally, they can also automate steps that don't need human intervention, both reducing cost of practice, and inceasing the timeliness of care.

RC853B Measuring Your Department with the SWIM Lexicon

Participants
Marc D. Kohli, MD, San Francisco, CA (*Presenter*) Research Grant, Siemens AG

LEARNING OBJECTIVES

1) Describe existing heterogeneity of workflow terminology. 2) Explain benefits arising use of a standard nomeclature for workflow steps. 3) Provide details regarding how the SWIM lexicon could be applied in the learner's environment.

ABSTRACT

In current practice, standard workflow steps such as the arrival of a patient to the imaging department, and completion of the exam are tracked in a very heterogenous manner with imprecise terminology. In order to better understand and compare workflow across radiology departments, a common language must be devised and deployed. The SIIM Workflow Initiave In Medicine (SWIM) lexicon aims to address this challenge. We will illustrate how the SWIM lexicon can be used to measure and compare workflow in a radiology department.

RC853C Monitoring Your Department with Dashboards

Participants
Christopher D. Meenan, Baltimore, MD, (cmeenan@umm.edu) (*Presenter*) Principal, Analytical Informatics, Inc; Stockholder, Analytical Informatics, Inc

LEARNING OBJECTIVES

1) Describe what a radiology department dashboard entails. 2) Give three examples of key performance indicators for a radiology

department. 3) Explain how dashboards have created an impact in other practices.

ABSTRACT

Leveraging dashboards and other business intelligence tools to measure and improve operational quality can be an effective way for clinical departments to navigate change. Unfortunately for many organizations, the simple acquisition of new technology or new software does not automatically translate to more efficient and effective operations. There is typically a cultural component that must be addressed, and that is essential to understand if an Imaging Department is to realize the key benefits of any technical solution. Defining clear goals around what to measure, understanding data quality issues, and ensuring organizational buy-in are all part of the journey to becoming a data-driven Department.

RC854

Growing Your Business with Social Media, Tips and Tricks for Department and Practice Managers

Friday, Dec. 4 8:30AM - 10:00AM Location: N229

IN LM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 0

Participants
Garry Choy, MD, MS, Boston, MA (*Presenter*) Nothing to Disclose
Geraldine B. McGinty, MD,MBA, New York, NY (*Presenter*) Nothing to Disclose
Alex Towbin, MD, Cincinnati, OH, (alexander.towbin@cchmc.org) (*Presenter*) Author, Reed Elsevier; Consultant, Reed Elsevier; Shareholder, Merge Healthcare Incorporated; Consultant, Guerbet SA; Grant, Guerbet SA

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Alex Towbin, MD - 2014 Honored Educator

RCA61

National Library of Medicine: Find Articles You Need: Searching PubMed/MEDLINE Efficiently (Hands-on)

Friday, Dec. 4 8:30AM - 10:00AM Location: S401AB

IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credits: 1.50

Participants
Chris Childs, MS, Iowa City, IA (*Presenter*) Nothing to Disclose
Holly Ann Burt, MLIS, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand how PubMed constructs a query and how to develop and refine effective search strategies in radiology. 2) Use PubMed tools including Clinical Queries, Related Articles, Single Citation Matcher and Loansome Doc. 3) Build focused searches using the Medical Subject Headings (MeSH) vocabulary for radiology and limit searches to radiology-oriented journals. 4) Understand how to save and download citations.

ABSTRACT

This hands-on workshop covers key searching techniques, changes to PubMed and how to develop effective search strategies for PubMed and MEDLINE. Topics covered include: why keywords don't always give the results you expect, how to limit to specific journals, quick searches to find evidence-based citations, how to access full-text articles, and downloading citations to reference manger programs. The National Library of Medicine (NLM) provides free web access to nearly 24 million citations for biomedical and clinical medical articles through PubMed (available online at PubMed.gov). MEDLINE is a subset of PubMed which includes links to sites providing full text articles and to other related databases and resources.

URL

Handout:Holly Ann Burt

http://abstract.rsna.org/uploads/2015/14003441/2015pubmedRSNA.pdf

SPNM61

Theranostics: Contributions of Diagnostic Nuclear Medicine and Targeted Radionuclide Therapy in Clinical Oncology (In Conjunction with SNMMI)

Friday, Dec. 4 8:30AM - 12:00PM Location: S504AB

GI HN MK NR CT MR NM OI RO

AMA PRA Category 1 Credits ™: 3.25
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants

LEARNING OBJECTIVES

1) An important aspect of Nuclear Medicine and Molecular Imaging is that the same core compound of the administered radiopharmaceutical can be labeled with both gamma emitters (for diagnostic) and beta (or alpha) emitters (for therapy), allowing for the targeted treatment of lesions. This is an expression of theranostics, the combination of therapy and diagnostics that is based on the specific tumor biology of each patient's disease. This proposed session will provide several examples of such paired diagnostic studies and treatements using Nuclear Medicine methods.

Sub-Events

SPNM61A Radioactive Iodine and Thyroid Cancer - Current Use and Controversies

Participants
Douglas Van Nostrand, MD, Washington, DC, (douglas.van.nostrand@medstar.net) (*Presenter*) Speakers Bureau, sanofi-aventis Group

LEARNING OBJECTIVES

1) Define remnant ablation, adjuvant treatment, and treatment of locoregional/distant metastases. 2) Discuss the indications and controversies of 131I for each. 3) Discuss the range of prescribed activity of 131I for each.

SPNM61B Bone Scintigraphy and the Use of Radionuclides in the Management of Patients with Metastatic Castrate-Resistant Prostate Cancer

Participants
Hossein Jadvar, MD, PhD, Los Angeles, CA, (jadvar@med.usc.edu) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To review bone scintigraphy with single photon and PET radiotracers in the imaging evaluation of patients with prostate cancer. 2) To summarize the results of the ALSYMPCA clinical trial for 223Ra dichloride therapy in patients with castrate resistant metastatic prostate cancer.

SPNM61C Updates on the Use of PET/CT (and PET/MRI) and Radioimmunotherapy in NHL

Participants
Erik S. Mittra, MD, PhD, Stanford, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

View learning objectives under main course title.

SPNM61D Peptide Receptor Radionuclide Imaging and Therapy: Where Are We in Europe and What Shall the US Do to Catch Up?

Participants
Frederik L. Giesel, MD, MBA, Heidelberg, Germany (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the concept of theragnostic. 2) Identify promising candidates for PRRT. 3) Challenges and limitations of PRRT. 4) Future perspective using alpha-emitters.

ABSTRACT

Well-differentiated neuroendocrine tumors (NETs) demonstrate modest responses to conventional chemotherapy due to their slow proliferation rate. However, the expression of somatosatin receptors by NET enables targeting with high affinity peptides. When these octreotide analgue peptides are labelled with beta emitters such as 90Y or 177Lu promising anti-tumor effects have been observed. The presentation will introduce the concept of theragnostic (68Ga-DOTATOC and 90Y/177Lu-DOTATOC) for improved patient stratefication. Today, PRRT is well established for a long time in NET-patients. However challenges and limitations will be discussed in regard to other systemic therapies such as everolimus or sunitinib. Finally, outlook will be given in regard to the novel of targeted alpha therapy in NET-patients and its implication to other tumor entities.

URL

SPNM61E Participant **Selective Internal Radiation Therapy for Hepatic Malignant Lesions**

Ghassan El-Haddad, MD, Tampa, FL, (ghassan.elhaddad@moffitt.org) (*Presenter*) Speaker Bureau, Bayer AG

LEARNING OBJECTIVES

View learning objectives under main course title.

SPFR61

Friday Imaging Symposium: Neuroimaging Emergencies

Friday, Dec. 4 12:30PM - 3:00PM Location: E253CD

HN NR ER

AMA PRA Category 1 Credits ™: 2.50
ARRT Category A+ Credits: 3.00

Participants
Christopher P. Hess, MD, PhD, Mill Valley, CA, (christopher.hess@ucsf.edu) (*Moderator*) Research Grant, General Electric Company; Research Grant, Quest Diagnostics Incorporated; Research Grant, Cerebrotech Medical Systems, Inc;

Sub-Events

SPFR61A CNS Infection

Participants
Ashley H. Aiken, MD, Atlanta, GA, (ashley.aiken@emoryhealthcare.org) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Recognize basic imaging patterns of CNS infection in the immunocompetent patient2) Use imaging features of specific pathogens along with clinical characteristics to narrow the imaging differential diagnosis and guide treatment.3) Recognize imaging features of opportunistic infections in the immunocompromised patient.

ABSTRACT

The radiologist plays a crucial role in identifying and narrowing the differential diagnosis of CNS infection. This case-based review aims to outline a practical imaging approach based on 5 basic imaging patterns: 1) Extra-axial infection 2) Ring-enhancing lesion 3) Temporal lobe lesion 4) Basal ganglia lesion 5) White matter abnormality. For extra-axial patterns of infection, it is key to search the paranasal sinuses, middle ear, and mastoid air cells for a source. It is also very important to look out for complications including brain abscess, dural sinus thrombosis, infarction, and hydrocephalus. The ring-enhancing pattern is the classic mimicker, and there is a long list of differential considerations. Frequently, the primary differential can be narrowed to infection versus neoplasm. However, close attention to the imaging features is critical to recognize non-operative ring-enhancing lesions such as tumefactive demyelination, subacute infarct, and subacute hematoma. The imaging characteristics that favor infection over neoplasm include a thin, smooth, ring-enhancement, "daughter cysts", a thinner ring of enhancement toward the ventricular surface and, of course, the "light bulb bright DWI" of a pyogenic abscess. When the temporal lobe imaging pattern is encountered, the primary diagnostic consideration should always be herpes encephalitis! Primary differential considerations for bilateral basal ganglia and white matter abnormalities include infection, toxic-metabolic etiologies, venous ischemia, hypoxic-ischemic injury and neoplasm. It is critical to know the patient's history and specifically their immune status.Within these broad imaging categories, a thorough understanding of the characteristic imaging features of specific pathogens and clinical history are essential to narrow the differential considerations and propose a more specific diagnosis. Neuroimaging also plays a pivotal role in diagnosing and monitoring the therapeutic response in opportunistic infections in the setting of HIV. This subset of infections will also be discussed within the context of the five basic imaging patterns listed above.References:1) Aiken AH. Central Nervous System Infection. Neuroimaging Clin N Am. 2010 Nov; 20 (4): 557-80

URL

Handout:Ashley Hawk Aiken

http://abstract.rsna.org/uploads/2015/15002667/CNSinfection.handout.RSNA.12.4.15.pptx

SPFR61B Evaluation and Management of Acute Stroke

Participants
Achala S. Vagal, MD, Cincinnati, OH (*Presenter*) Research Grant, F. Hoffmann-La Roche Ltd;

LEARNING OBJECTIVES

1) To review the classic imaging features of acute ischemic stroke. 2) To review the role of imaging selection in evaluation and management of acute stroke. 3) To review stroke mimics.

ABSTRACT

The landscape of acute ischemic stroke treatment is rapidly changing with multiple positive endovascular trials. In the current scenario, neuroimaging plays a vital role in the diagnosis, triage and treatment of acute ischemic stroke patients. Comprehensive evaluation of brain parenchyma, vessel status and tissue perfusion is critical in patient selection. This case based course will highlight the practical aspects of acute ischemic stroke evaluation in the emergency setting.

URL

SPFR61C Intracranial Hemorrhage: Pearls and Pitfalls

Participants
Jalal B. Andre, MD, Seattle, WA, (drjalal@uw.edu) (*Presenter*) Research Grant, Koninklijke Philips NV; Consultant, Hobbitview, Inc; Research Grant, Toshiba Corporation;

LEARNING OBJECTIVES

1) Gain a deeper understanding of how etiology, location, and timing of intracranial hemorrhage may affect patient disposition and

1) Gain a deeper understanding of how etiology, location, and timing of intracranial hemorrhage may affect patient disposition and outcome, and review pertinent associated radiological findings. 2) Explore recent imaging methods that better characterize intracranial hemorrhage and its components. 3) Discuss current treatment strategies for managing intracranial hemorrhage that are relevant to radiologists.

ABSTRACT

Intracranial hemorrhage has been traditionally classified as intra- versus extra-axial in location, and can arise from a variety of etiologies. We will focus on the above learning objectives through a case-based exploration of intracranial hemorrhage and associated complications as they pertain to the following locations:1) Intraventricular2) Intraparenchymal3) Subarachnoid4) Subdural5) Epidural

URL

SPFR61D Spine Emergencies

Participants
Jason F. Talbott, MD, PhD, San Francisco, CA, (jason.talbott@ucsf.edu) (*Presenter*) Data Safety Monitoring Board, StemCells, Inc

LEARNING OBJECTIVES

1) Gain familiarity with the s ubaxia l i njury c lassification system (SLIC) for cervical spine trauma and AOSpine t horaco l umbar i njury c lassification s ystem (TLICS) for thoracolumbar spine trauma. 2) Review standardized nomenclature for vertebral fracture morphology descriptions utilized by both SLIC and TLICS. 3) Review a systematic checklist for spinal imaging findings in the setting of suspected non-traumatic spinal emergencies.

ABSTRACT

The radiologist plays a critical role in evaluation of spinal emergencies, both traumatic and nontraumatic. With respect to traumatic spine emergencies, the primary focus of this review is to familiarize the radiologist with the increasingly utilized classification systems employed by many spine surgeons for (1) subaxial cervical spine trauma known as subaxial injury classification (SLIC) and (2) thoracolumbar spine trauma known as thoracolumbar lumbar injury classification system (TLICS) and the more recently updated AOSpine TLICS. These grading schemes were designed by surgeons to aid in surgical decision-making and share in common some descriptive nomenclature related to vertebral body fracture morphology, discoligamentous complex integrity, and frank spine displacement/translation injury. It is important that the radiologist interpreting spinal trauma studies is familiar with these classifications schemes as they are increasingly supplanting older classification systems for surgical decision-making. Finally, a case-based review of non-traumatic spinal emergencies will be undertaken to emphasize a systematic checklist for imaging findings suggesting emergent pathology.

URL

SPFR61E Head and Neck Emergencies

Participants
Jenny K. Hoang, MBBS, Durham, NC, (jennykh@gmail.com) (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe imaging findings of acute head and neck diseases that are emergencies. 2) Apply a systematic checklist to identify key imaging findings that could lead in significant morbidity or mortality.

ABSTRACT

This will be a case-based presentation of imaging findings of head and neck emergencies categorized into 4 clinical scenarios:1. Fever2. Trauma3. Difficulty breathing4. Epistaxis

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