Gastrointestinal Radiology

Program subject to change until 12/16/2019.

RSNA® 2019
SEE POSSIBILITIES — TOGETHER

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago

GI001-EB-X

Intrahepatic Biliary Tree Anatomic Variants: MRCP Findings

All Day Room: GI Community, Learning Center Hardcopy Backboard

Participants
Maria I. Wulf, MD, Lomas de Zamora, Argentina (*Presenter*) Nothing to Disclose
Nadia S. Gonzalez, MD, Dresden, Germany (*Abstract Co-Author*) Nothing to Disclose
Mauricio W. Silva Gonzales, MD, Lomas de Zamora, Argentina (*Abstract Co-Author*) Nothing to Disclose
Juliana Marulanda, MD, Buenos Aires Captial, Argentina (*Abstract Co-Author*) Nothing to Disclose
Claudio H. Bruno, MD, Lomas de Zamora, Argentina (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

MR Cholangiopancreatography (MRCP) has become the modality of choice for noninvasive assessment of the bile duct anatomy. Anatomic variants of the biliary tree are common, therefore an accurate knowledge is crucial in hepatobiliary or gallbladder interventional procedures. The purpose of this exhibit is: -To describe and illustrate normal biliary tree anatomy and its anatomical variants. -To determine the frequency of intrahepatic bile duct anatomic variants on MRCP. -To outline their importance to clinical practice.

TABLE OF CONTENTS/OUTLINE

-Normal biliary ductal anatomy and anatomical variants. • Blumgart Classification. • Schematic drawings and MRCP correlation. -Frequency of presentation. -Imaging Findings. -Conclusion. -References.

Printed on: 10/29/20

GI002-EB-X

Imaging and Review of Cholecystectomy Complications

All Day Room: GI Community, Learning Center Hardcopy Backboard

Participants
Berenice Lopez Leal, MD, Staten Island, NY (*Presenter*) Nothing to Disclose
Daniel M. Eisman, MD, Staten Island, NY (*Abstract Co-Author*) Nothing to Disclose
Brent Cham, BS,MS, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose
Rachel Saks, BS, Rego Park, NY (*Abstract Co-Author*) Nothing to Disclose
Steven Peti, MD, Staten Island, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

blopezleal@northwell.edu

TEACHING POINTS

- Review postoperative biliary anatomy & imaging modalities - Familiarize radiologists with late post-cholecystectomy complications & associated imaging findings

TABLE OF CONTENTS/OUTLINE

Acute cholecystitis is a frequent cause of abdominal pain with surgical intervention being the definitive management in majority of cases. More than half a million cholecystectomies are performed annually in the United States. The broad category of post-cholecystectomy complications includes pathologies such as papillary stenosis, choledocholithiasis, biliary stricture, remnant gallbladder, and dropped gallstones, amongst others. Imaging plays an essential role in both the diagnosis of late complications as well as determining treatment options. Though no imaging modality is specific for any one complication, it is important for the radiologist to understand the utility and limitations of each modality in order to direct care and further workup for patients suspected of having a late complication from prior cholecystectomy. •Prevalence of cholecystectomy in united states •Postoperative biliary anatomy •Imaging modalities of postoperative biliary system •Case examples of late post-cholecystectomy complication and associated imaging findings (Papillary stenosis, Dropped gallstones, Choledocholithiasis, Remnant gallbladder, Biliary Stricture)

Printed on: 10/29/20

GI003-EB-X

Quality Assessment of Diagnostic Accuracy Studies (QUADAS)-2 Tool: A Practical Approach Using the Liver Imaging Reporting and Data System (LI-RADS)

All Day Room: GI Community, Learning Center Hardcopy Backboard

Participants
Christian B. van der Pol, MD, Hamilton , ON (*Presenter*) Nothing to Disclose
Christopher Lim, MD, Toronto , ON (*Abstract Co-Author*) Nothing to Disclose
Islam H. Zaki, MBBCh, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Mustafa R. Bashir, MD, Cary, NC (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, NGM Biopharmaceuticals, Inc; Research Grant, Madrigal Pharmaceuticals, Inc; Research Grant, Metacrine, Inc; Research Grant, Pinnacle Clinical Research; Research Grant, ProSciento Inc; Research Grant, Carmot Therapeutics; Research Grant, 1Globe Health Institute; Research Consultant, ICON plc;
An Tang, MD, Montreal, QC (*Abstract Co-Author*) Research Consultant, Imagia Cybernetics Inc Speaker, Siemens AG Speaker, Eli Lilly and Company
Irene W. Cruite, MD, Spokane, WA (*Abstract Co-Author*) Nothing to Disclose
Claude B. Sirlin, MD, San Diego, CA (*Abstract Co-Author*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc
Matthew D. McInnes, MD, PhD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

vanderpolc@hhsc.ca

TEACHING POINTS

A) To review the application of the Quality Assessment of Diagnostic Accuracy Studies (QUADAS)-2 tool using the Liver Imaging Reporting and Data System (LI-RADS). This practical tool to evaluate risk of bias in studies evaluating hepatocellular carcinoma can be used in systematic reviews, journal clubs and research designB) To provide guidance on establishing an ideal reference standard for diagnostic imaging research and how to quantify bias when a different reference standard is usedC) To discuss common sources of bias in diagnostic accuracy researchD) To review best practices of diagnostic test accuracy systematic reviews

TABLE OF CONTENTS/OUTLINE

1. Background of QUADAS-2 and LI-RADS2. Components of QUADAS-2 and developing signaling questions- Patient Selection- Index Test- Reference Standard- Flow and Timing3. Establishing an ideal reference standard- Pathology based reference standards- Non-pathology-based reference standards4. Quantifying bias when a non-ideal reference standard is used- Bias in relation to scope of research question5. Common pitfalls of diagnostic accuracy research- Sources of bias- Accounting for bias in systematic reviews using meta-regression and sensitivity analysis6. Diagnostic test accuracy systematic review best practice- Contemporary guidelines and current expert recommendations

GI004-EB-X

Mimickers of Hepatocellular Carcinoma in the Setting of Chronic Liver Disease

All Day Room: GI Community, Learning Center Hardcopy Backboard

Participants
Marshall Meeks, MD, St. Louis, MO (*Presenter*) Nothing to Disclose
Affan Umer, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Robert W. Garrett, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Imaging plays a crucial role in the noninvasive diagnosis of hepatocellular carcinoma (HCC). The Liver Imaging Reporting And Data System (LI-RADS) is a standardized system for liver imaging terminology, technique, interpretation, and reporting which is endorsed by the American College of Radiology. CT/MRI LI-RADS utilizes major and ancillary features to categorize observations detected on CT or MRI in patients with chronic liver disease. Strict adherence to LI-RADS major and ancillary features reduces false positives and increase sensitivity and specificity for the diagnosis of HCC. Here, we present examples of non-HCC observations that would be diagnostic of HCC if major features alone were used in image interpretation. Strict adherence to LI-RADS, including use of ancillary features, is helpful to reduce false positives. Nevertheless, some observations are indistinguishable from HCC and may be not be diagnosed unless surgery or biopsy is performed.

TABLE OF CONTENTS/OUTLINE

Summary of LI-RADS 2018 CT/MRI Diagnostic Algorithm Malignant mimickers of HCC Cholangiocarcinoma/Biphenotypic HCC Lymphoma Metastatic disease Benign mimickers of HCC Regenerative nodules/Budd-Chiari syndrome Dysplastic nodules Splenosis Adrenal rest Hemangioma

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI005-EB-X

Too Hard to Differentiate? Pictorial Review of Lesser Sac Diseases Focusing Cystic or Cavitary Change

All Day Room: GI Community, Learning Center Hardcopy Backboard

Participants
Hye Won Lee, MD, Anyang-si , Korea, Republic Of (*Presenter*) Nothing to Disclose
Hong-Il Ha, MD, Anyang-si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Min-Jeong Kim, Anyang, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ha.hongil@gmail.com

TEACHING POINTS

1. To provide a basic understanding of the anatomy of the lesser sac. 2. To review the characteristic imaging features of various cystic lesions encountered in the lesser sac with comprehensive literature review. 3. To discuss the differential point to approach the diagnosis of lesser sac diseases presenting as a cystic lesion.

TABLE OF CONTENTS/OUTLINE

A. Anatomy of the lesser sac and its location B. Characteristic imaging findings of cystic lesions in the lesser sac according to the disease category I. Congenital or developmental lesions 1. Portal vein variant 2. Enteric duplication cyst, diverticulum 3. Lymphangioma II. Neoplasm 1. Neurogenic tumors A. Nerve sheath (schwannoma) B. Paraganglionic cells (pheochromocytoma, paraganglioma) C. Ganglionic cells (ganglioneuroma, ganglioneuroblastoma, neuroblastoma) 2. Germ cell origin: mature cystic teratoma 3. Pancreas: MCN, SCA, IPMN, lymphoepithelial cyst 4. CBD : IPNB 5. GIST with cystic change III. Miscellaneous 1. Infection/inflammatory (pseudocyst, abscess) 2. Lymph node (benign vs. malignant lymphadenopathy) 3. Foramen Winslow hernia with strangulation

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI006-EB-X

Pneumatosis Intestinalis in Adult Bilateral Lung Transplant Patients: A Single Institution Experience and Literature Review

All Day Room: GI Community, Learning Center Hardcopy Backboard

Participants
Eric M. Christiansen, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose
Matthew L. Harwood, MD, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose
Olga M. Kalinkin, MD, Goodyear, AZ (*Abstract Co-Author*) Nothing to Disclose
Amy Trahan, MD, Mesa, AZ (*Abstract Co-Author*) Nothing to Disclose
Sofya Tokman, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose
David Row, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

chri2408@umn.edu

TEACHING POINTS

At our institution we have seen 24 cases out of 501 (4.8%) bilateral lung transplant recipients since 2014. Based on our experience pneumatosis interstitials in adult patients post bilateral lung transplants 1. Predominately occurs within ascending colon/hepatic flexure ± transverse/descending colon. 2. It has more of an expansile/bubby appearance (pneumocystis coli with more air in subserosal than in the submucosal layer) compared to typical PI in nontransplant patients 3. Can be associated with free intraperitoneal or extraperitoneal air, mesenteric gas, and portal venous gas. 4. Based on our institutions and as well as historical literature data, PI tends to be a benign finding without any reported cases of complications. 5. When PI findings are seen in the proper setting (asymptomatic patients, benign physical examination, normal lactate level), they can be followed safely without any additional workup or intervention.

TABLE OF CONTENTS/OUTLINE

1. Pneumatosis intestinalis (PI) definition and prevalence in lung transplant patient's literature review 2. PI imaging appearance and clinical presentation in adult patients with bilateral lung transplant from our institution 3. PI follow up and recommendations 4. Summary of teaching points 5. References

Printed on: 10/29/20

GI007-EB-X

Morphologic and Functional Features of Cholestatic Liver Diseases Using Gadoxetic Acid-Enhanced MRI

All Day Room: GI Community, Learning Center Hardcopy Backboard

Participants
Ahmed Ba-Ssalamah, MD, Vienna, Austria (*Abstract Co-Author*) Consultant, Bayer AG Speaker, Novartis AG Speaker,Siemens AG Speaker, Bayer AG
Nina Bastati, MD, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Yesim Bican, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Michael Elmer, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Sarah Poetter-Lang, Vienna, Austria (*Abstract Co-Author*) Nothing to Disclose
Lucian Beer, MD,PhD, Vienna, Austria (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ahmed.ba-ssalamah@meduniwien.ac.at

TEACHING POINTS

To demonstrate the broad spectrum of morphologic and functional features of cholestatic liver diseases. To describe the performance of conventional T2-weighted MRCP, DWI, as well as gadoxetic acid-enhanced T1 MRC in the diagnostic work-up of cholestatic liver diseases.

TABLE OF CONTENTS/OUTLINE

Cholestatic liver diseases are a large group of biliary disorders, including primary sclerosing cholangitis (PSC), primary biliary cirrhosis (PBC), ischemic cholangiopathy, chronic rejection following liver transplant, drug-induced liver injury (DILI), etc. In some cases, the combined presence of autoimmune hepatitis (AIH) and PSC or PBS, simultaneously, is called the 'overlap' syndrome. Furthermore, the group of ductal plate malformations, which include congenital cystic fibrosis (CF), Von Meyenburg complexes, Caroli syndrome, and choledochal cysts, among others, belong to cholestatic liver diseases and will be presented and discussed. New MRI techniques, such as MRCP, diffusion-weighted imaging (DWI) and gadoxetic acid-enhanced T1 MRC enable a noninvasive and early diagnosis of bile duct abnormalities, as well as detection of complications, such as dominant stricture, cholangiocarcinoma, and fibrosis or cirrhosis. This information is crucial for correct management, as well as for the prognostic course of the disease and for monitoring after intervention.

GI100-ED-X

Imaging of Hepatocellular Carcinoma Treated by Proton Beam Therapy: What Radiologists Should Know

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Hiroaki Takahashi, MD, Tokyo, Japan (*Presenter*) Nothing to Disclose
Takashi Hiyama, MD, Kashiwa, Japan (*Abstract Co-Author*) Nothing to Disclose
Yuta Sekino, Ibaraki, Japan (*Abstract Co-Author*) Nothing to Disclose
Toshiyuki Okumura, MD, Ibaraki, Japan (*Abstract Co-Author*) Nothing to Disclose
Hirofumi Kuno, MD, PhD, Kashiwa, Japan (*Abstract Co-Author*) Nothing to Disclose
Katsuhiro Nasu, MD, PhD, Tsukuba, Japan (*Abstract Co-Author*) Nothing to Disclose
Kensaku Mori, MD, Tsukuba, Japan (*Abstract Co-Author*) Nothing to Disclose
Kuniaki Fukuda, MD, Tsukuba, Japan (*Abstract Co-Author*) Nothing to Disclose
Takashi Iizumi, Ibaraki, Japan (*Abstract Co-Author*) Nothing to Disclose
Sota Masuoka, MD, Setagaya-ku,Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose
Takahiro Hosokawa, Shinjuku, Japan (*Abstract Co-Author*) Nothing to Disclose
Hideyuki Sakurai, MD, PhD, Tsukuba, Japan (*Abstract Co-Author*) Nothing to Disclose
Manabu Minami, MD, PhD, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

h.1982.takahashi@gmail.com

TEACHING POINTS

In recent years, there is a growing interest in proton beam therapy (PBT) as a therapeutic option for hepatocellular carcinoma (HCC). This exhibit will discuss the way to solve the diagnostic dilemma radiologists will face in evaluating the therapeutic response of HCC after PBT. Sufficient knowledge of the radiological features of the treated HCCs as well as the surrounding irradiated parenchyma is necessary for the interpretation of local tumor control. Further, imaging assessment for other treatments (including transarterial catheterization and sorafenib) is also required, in case the local or remote recurrence was re-treated. Familiarity with these imaging findings will contribute to the accurate diagnosis, resulting in better patient outcome. The purposes of this exhibit are: 1. To discuss the diagnostic strategy to assess the treatment response of HCC after PBT, with comparing the radiologic and pathologic findings of irradiated HCC and liver parenchyma. 2. To review the re-treatment options for the recurrent HCC after PBT, and their associated imaging findings.

TABLE OF CONTENTS/OUTLINE

1. Overview of PBT for HCC 2. Radiological and pathological appearance of irradiated liver parenchyma and HCC after PBT. 3. Treatment response of HCC after PBT 4. Imaging findings of re-treated recurrent HCC after PBT 5. Summary

GI101-ED-X

Fat and Flow: Secondary Signs that Improve the Diagnosis of Appendicitis in the Sonographically Equivocal Appendix

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Joseph J. Tseng, MD, Palo Alto, CA (*Presenter*) Nothing to Disclose
R. Brooke Jeffrey Jr, MD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Eric W. Olcott, MD, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jtseng3@stanford.edu

TEACHING POINTS

1. Sonographic grayscale criteria using maximum outer diameter (MOD) is effective for diagnosing appendicitis when appendix is normal (<6mm) or clearly abnormal (>8mm). 2. However, using only the maximum outer diameter (MOD) for sonographic diagnosis of appendicitis is challenging in cases where the MOD is 6 to 8 mm, as this is an equivocal category. 3.To improve specificity, we utilize three additional criteria: quantitative color Doppler information (mural flow pattern), quantitative spectral Doppler information (peak systolic velocity and resistive index values), and presence of hyperechoic periappendiceal fat.

TABLE OF CONTENTS/OUTLINE

• Background of the sonographic evaluation of appendicitis • Review MOD criterion for diagnosis and significance of the equivocal category • Discuss three additional sonographic criteria to improve specificity of diagnosis, in addition to the maximum outer diameter measurement • Quantitative color Doppler flow (dot versus curvilinear mural flow) • Quantitative spectral Doppler flow (peak systolic velocity and resistive index) • Periappendiceal fat • Example cases

GI102-ED-X

Brief Guide: Ultrasound Evaluation of Organ Transplant

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Krishna H. Patel, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Malak Itani, MD, Clayton, MO (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Understand anastomotic techniques used in liver, renal and pancreatic transplantation Identify expected post-transplant findings and transient changes Detect acute and subacute post-transplant complications Recognize essential abnormalities in long term follow-up or transplanted abdominal organs

TABLE OF CONTENTS/OUTLINE

Liver transplantation Liver transplantation anastomoses (arterial, portal venous, venous, biliary) Range of normal and transient post-operative ultrasound findings and reference values Complications (vascular, biliary, rejection, other) Renal transplantation Renal transplant anastomoses (arterial, venous, ureteral) Normal ultrasound findings and reference values Complications (vascular, urinary, parenchymal: rejection, ATN, drug nephrotoxicity) Pancreatic transplantation Pancreatic anastomoses (arterial, venous, enteric) Normal ultrasound findings Complications (vascular, other) Advanced techniques (contrast enhanced ultrasound, elastography)

Printed on: 10/29/20

GI103-ED-X

The Postsurgical Pelvis: Expected Findings versus Complications

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Raymond Ramzi, MD, Brooklyn, NY (*Abstract Co-Author*) Nothing to Disclose
Neha H. Doshi, MD, Brooklyn, NY (*Abstract Co-Author*) Nothing to Disclose
Dan I. Cohen-Addad, MD, Brooklyn, NY (*Presenter*) Nothing to Disclose
Patrick J. Hammill, MD, Brooklyn, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Dan.Cohen-Addad@downstate.edu

TEACHING POINTS

Review pelvic anatomical spaces. Describe normal vs abnormal post-surgical findings. Learn a multifactorial algorithm for differentiating normal vs abnormal post-surgical findings.

TABLE OF CONTENTS/OUTLINE

Post-surgical cases of the pelvis are routinely countered. However, postsurgical findings often pose a diagnostic dilemma in the differentiation between expected normal changes vs pathologic changes. Familiarity between normal and abnormal is essential for correct management. This differentiation is multifactorial and depends on a variety of factors including timing, surgical approach, and clinical background. After reviewing the pelvic anatomical spaces, we present a variety of cases illustrating normal and pathologic findings. We categorize cases per their chronological presentation and analyze factors such as timing, technique and clinical presentation to make an efficient algorithm for differentiating normal vs pathologic post-surgical findings. Cases:Post-operative gas collection/fluid collections,infection/abscess,hemorrhage,surgical wound infection/dehiscence,anastomosis leak,obstruction/ileus,bowel perforation,urinary tract injuries,urinoma,lymphocele,bladder flap/subfascial hematoma,uterine dehiscence/rupture,omental infarcts,venous thrombosis,fistulas,peritoneal inclusion cysts, scar carcinoma,j pouchitis,osteomyelitis.

GI104-ED-X

Ultrasound in Perineal Fistulas and Abscesses

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Bhavin R. Patel, MBBS, MD, Surat, India (*Presenter*) Nothing to Disclose
Nitin G. Chaubal, MD, MBBS, Thane, India (*Abstract Co-Author*) Nothing to Disclose
Rajas N. Chaubal, MBBS,MD, Thane, India (*Abstract Co-Author*) Nothing to Disclose
Jevin R. Patel, MBBS, Mumbai, India (*Abstract Co-Author*) Nothing to Disclose
Krishna B. Patel, MBBS, Surat, India (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

drbrpatel20@gmail.com

TEACHING POINTS

• Review of perianal anatomy. • Tips and tricks in techniques of ultrasound using various probes. • To enable the reader to identify the internal opening of fistula, course of the tract and other complications. • To review the classification system of fistula in ano.

TABLE OF CONTENTS/OUTLINE

• Review of literature about Ultrasound in perianal fistulas and abscesses. • Importance of appropriate approach (transanal or transvaginal and transperineal) for optimum evaluation of perineal region. • To discuss widely used classification of perianal fistula - Parks' classification which describes intersphincteric, transsphincteric, extrasphincteric and suprasphincteric types. • To discuss limitations of Parks' classification. • Importance of assessment of perineal fistula prior to surgery (including the status of external openings, the course of fistula with branches and associated complications if any.)

GI105-ED-X

The Mysterious Mesentery: An Imaging Review

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Mayada Dabajeh, MD, Dearborn, MI (*Presenter*) Nothing to Disclose
Robert Colvin, DO, Berkley, MI (*Abstract Co-Author*) Nothing to Disclose
Sayf A. Al-Katib, MD, Royal Oak, MI (*Abstract Co-Author*) Nothing to Disclose
Monisha Shetty, MD, Royal Oak, MI (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

mayada.dabajeh@beaumont.org

TEACHING POINTS

1 - Define the contents of the mesentery.2 - Identify the various pathology that can occur within the mesentery.3 - Recognize benign disorders of the mesentery.4 - List malignancies which commonly affect the mesentery.

TABLE OF CONTENTS/OUTLINE

-Introduction to the mesentery-The remaining slides will show multiple cases in a quiz format. Every case will have a brief patient history and sample images, or when necessary, cine movie clips. The next slide will provide the diagnosis and describe the imaging findings, along with background information for the entity, typical imaging characteristics, and mimics (if applicable). -A list of cases include:• Mesenteric panniculitis • Mesenteric lymphoma• Retractile mesenteritis• Amyloidosis • Carcinoid tumor• Desmoid tumor• Mesenteric edema caused by portal vein thrombosis• Mesenteric edema caused by midgut volvulus • Solitary fibrous tumor• Mesothelioma• Liposarcoma • Tuberculosis

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI106-ED-X

Pearls and Pitfalls in Multimodality Imaging of Colonic Volvulus

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Identified for RadioGraphics

Participants
Jeremy R. Wortman, MD, Burlington, MA (*Presenter*) Nothing to Disclose
Manish Dhyani, MBBS, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Sarah M. Ali, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Francis J. Scholz, MD, Burlington, MA (*Abstract Co-Author*) Owner, F Spoon Company; Spouse, Owner, F Spoon Company

For information about this presentation, contact:

Jeremy.wortman@lahey.org

TEACHING POINTS

1) Colonic volvulus (CV) is a rare condition in which the large bowel twists along its mesentery causing symptoms from large bowel obstruction and associated vascular compromise. If not treated promptly, volvulus can lead to infarction or perforation.2) Clinical symptoms of colonic volvulus are non-specific, and imaging plays a crucial role in diagnosis, generally with plain radiographs initially and computed tomography or water-soluble enema (WSE) to confirm. 3) Computed tomography has the advantage of being able to diagnose colonic volvulus, and to delineate complications such as bowel ischemia or perforation. 4) WSE can provide valuable diagnostic information, and possibly achieve reduction, particularly in the case of sigmoid volvulus.

TABLE OF CONTENTS/OUTLINE

1) Background of the demographics and pathophysiology of the most common types of colonic volvulus2) Review of appropriate imaging work-up of patients with suspected volvulus3) Case-based review of the imaging findings in common and uncommon types of colonic volvulus, with a focus on findings that will change patient management4) Summary of diagnostic pitfalls and how they can be avoided

Printed on: 10/29/20

GI107-ED-X

Small Bowel Malignancies

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Eva Poelman, MD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Gerben Zwezerijnen, MD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Jan Hein van Waesberghe, MD, PhD, Amsterdam , Netherlands (*Abstract Co-Author*) Nothing to Disclose
Karin Horsthuis, MD, PhD, Amsterdam, Netherlands (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

e.poelman@vumc.nl

TEACHING POINTS

The incidence of primary small bowel malignancies is very low and diagnosing them is challenging. The purpose of this exhibit is to outline the most common small bowel malignancies and discuss their characteristics on cross-sectional imaging.

TABLE OF CONTENTS/OUTLINE

Carcinoid tumors and adenocarcinoma each account for ±37% of all small bowel tumors, lymphoma for ±17% and stromal tumors for ±8%. Adenocarcinomas occur mostly in the duodenum and jejunum, carcinoid tumors usually occur in the appendix and terminal ileum. Lymphoma and stromal tumors are seen anywhere along the gastro-intestinal tract. The predominant finding in carcinoid tumors is a desmoplastic reaction in the mesentery, seen as an ill-defined mass with traction and calcification. If the tumor itself is conspicuous, it is seen as a small transmural hypervascular nodule. Adenocarcinoma in early stages present as a polypoid mass, with or without intussusception. Later stages show an annular mass with shouldering borders and constriction. Lymphoma typically present as a homogeneously attenuating mural thickening with destruction of the myenteric plexus and muscle wall, causing luminal dilatation. Polypoid masses can also be seen. Bulky regional and retroperitoneal lymphadenopathy is typical. Stromal tumors present as an eccentric large mass with central necrosis and sometimes calcification.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI108-ED-X

Differential Diagnosis of Left Iliac Fossa: Diagnostic Approach by Ultrasound Beyond Acute Diverticulitis

All Day Room: GI Community, Learning Center Digital Education Exhibit

FDA Discussions may include off-label uses.

Participants
Nerea Alberdi, MD, Vitoria, Spain (*Presenter*) Nothing to Disclose
Paul Lopez, MBBS, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Guillermo Unzue, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Loreto De Llano, Pamplona , Spain (*Abstract Co-Author*) Nothing to Disclose
Tamara A. Lage, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Nuria Alonso, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Claudio Antonio Saavedra Gutierrez, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

nalberdi001@gmail.com

TEACHING POINTS

-Describe the different medical conditions that may involve the left iliac fossa (LIF). -Review the radiological features of LIF pathologies in ultrasound correlating them with findings in CT. -Analyze the limitations of ultrasound technique.

TABLE OF CONTENTS/OUTLINE

1. Description of the anatomy and components of the left iliac fossa (LIF). 2. Diagnostic approach of the LIF abdominal pain; including renal disease (renal colic, renal lithiasis and pyelonephritis), sigmoid and descendent colon pathology (acute diverticulitis, colorectal cancer, colitis) and other ethiologies; such as inguinal hernia, epiploic appendagitis, omental infarction or ovarian disorders. 3. Pictorial review of pathological findings observed in ultrasound in our radiology department from 2014 to 2018; correlating them with those found in CT. 4. Analysis of advantages and limitations of the ultrasound technique. 5. Conclusion and summary.

Printed on: 10/29/20

GI109-ED-X

Spectrum of CT Findings in Amebic Colitis

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Eliko Tanaka, MD, Yokohama, Japan (*Presenter*) Nothing to Disclose
Nobuyuki Takeyama, MD, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose
Yuki Tashiro, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose
Akio Kotake, MD, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose
Kyoko Nagai, MD, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshiro Hori, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Toshi Hashimoto, MD, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshimitsu Ohgiya, MD, Shinagawa-ku, Japan (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

E histolytica is distributed throughout the world. 40-50 million people become invasive amebiasis in the world and 40,000-100,000 deaths per year due to complications of the invasive disease. In countries where fecal-oral transmission is unusual, amebic colitis is not common and infection may be seen in travelers to and immigrants from endemic areas. Without adequate treatment, amebic colitis may be fulminant and be rapidly fatal. CT findings of amebic colitis often mimic other diseases. It is important for radiologists to know the imaging findings of amebic colitis. The aim of this exhibit is to describe the pathogenesis and histopathological features and to illustrate the spectrum of CT findings of amebic colitis using case-based examples.

TABLE OF CONTENTS/OUTLINE

1. Epidemiology of amebiasis 2. Pathogenesis of amebic colitis 3. Clinical findings of amebic colitis 4 Diagnosis of amebic colitis 5.CT findings of amebic colitis using case-based examples 6. Differential diagnosis of imaging findings

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI110-ED-X

Colorectal Cancer Mimics: A Lineup of the 'Usual Suspects' with Radiologic-Pathologic Interrogation

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Snehansh R. Chaudhary, MBBS, Liverpool, United Kingdom (*Presenter*) Nothing to Disclose
Sara M. Meredith, MBChB, Warrington, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Akash Ganguly, MBBS, FRCR, Warrington, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Chinedum N. Anosike, MBBS, FRCR, Widnes, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Cairine Probert, MBBCh, Liverpool, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

snehansh.chaudhary@nhs.net

TEACHING POINTS

The purpose of this exhibit is to: Highlight the significant overlap in the appearances of colorectal malignancy and its mimics. Provide a helpful classification to categorise the mimics. Review the imaging features of the mimics with example cases. Reiteritating the importance of relevant clinical history, tissue histology and discussion at multidisciplinary team meeting to reach a conclusive and accurate diagnosis.

TABLE OF CONTENTS/OUTLINE

Increasing use of CT Colon for presumptive diagnosis of colorectal malignancy Pattern of features on CT to differentiate between malignant and non-malignant pathologies Helpful classification for colorectal cancer mimics into following conditions: -Inflammatory -Neoplastic -Miscellaneous Sample cases for each condition Review the imaging features of these mimics Radiologic-pathologic correlation, where appropriate Learning points and conclusion

Printed on: 10/29/20

GI111-ED-X

The Challenge of Unenhanced Body CT: How to Enhance Your Read

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Jonathan H. Stein, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Anup S. Shetty, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Maria Zulfiqar, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Demetrios A. Raptis, MD, Frontenac, MO (*Abstract Co-Author*) Nothing to Disclose
Mark J. Hoegger, MD, PhD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jhstein@wustl.edu

TEACHING POINTS

Unenhanced body CT is frequently performed in patients who are acutely or critically ill and have contraindications to intravenous contrast administration. These cases can be challenging and special attention to the basic physics of CT and how to optimize interpretation are critical to maximizing the utility and diagnostic yield of these studies, with careful attention to subtle clues indicating the presence of disease. The purpose of this exhibit is for the reader to: 1. Develop an understanding of basic CT physics concepts of attenuation and how window levels can be manipulated to emphasize pathology. 2. Recognize common indications for enhanced body CT. 3. Review the utility of unenhanced body CT through a series of illustrative cases.

TABLE OF CONTENTS/OUTLINE

Describe the basic physics of CT attenuation and windowing. Case-based review of applicable concepts including: -GI, GU, intraperitoneal, and muscular hemorrhage -Bowel disease: obstruction, diverticulitis, omental infarction and epiploic appendagitis -Evaluation of renal, liver, adrenal and pancreatic masses -Acute aortic syndromes and post-operative aortic findings -Venous thrombosis -Renal and biliary lithiasis -Lower thorax: pulmonary infarct, pneumonia/aspiration, pericardial effusion

Printed on: 10/29/20

GI112-ED-X

Role of Computed Tomography and Magnetic Resonance Imaging Findings in the Diagnosis of Rectal Submucosal Tumors

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Kazuya Matsunari, MD, Yokohama, Japan (*Presenter*) Nothing to Disclose
Kota Watanabe, MD, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose
Norihiro Hashizume, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose
Hidefumi Fujisawa, MD, Kanagawa, Japan (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

1.To understand the rectal anatomy by computed tomography (CT) and magnetic resonance imaging (MRI). 2.To understand the CT and MRI findings of rectal submucosal tumors, and these techniques' advantages.

TABLE OF CONTENTS/OUTLINE

Rectal submucosal lesions include various benign (lipomas, lymphangiomas, and hemangiomas) and malignant (carcinoid tumors, malignant lymphomas, and gastrointestinal stromal tumors) tumors. Rectal tumors are often diagnosed with optical colonoscopy and/or endoscopic ultrasonography. Full characterization of rectal submucosal tumors may be difficult with optical colonoscopy alone, and endoscopic biopsy is often not useful, in contrast with other rectal tumors. CT and MRI can detect the precise extent and depth of the tumor, and help select the best surgical method for treatment. CT and MRI allow evaluation of the entire thickness of the bowel wall and surrounding tissues, and often provide information regarding the detection of lesions, qualitative diagnosis, relationship between the tumor and surrounding organs, and evaluation of malignancy including the detection of metastatic disease. CT colonography may be useful for detecting mucosal pathologies. We demonstrate the characteristics of rectal submucosal tumors, including colonoscopic and histopathological findings, with emphasis on CT and MRI findings.

GI113-ED-X

Extraosseous Multiple Myeloma: Imaging Spectrum in the Abdomen and Pelvis

All Day Room: GI Community, Learning Center Digital Education Exhibit

FDA Discussions may include off-label uses.

Participants
Rachel H. Cho, MD, Detroit, MI (*Presenter*) Nothing to Disclose
Daniel T. Myers, MD, Detroit, MI (*Abstract Co-Author*) Nothing to Disclose
Todd Williams, MD, Detroit, MI (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

rachelc@rad.hfh.edu

TEACHING POINTS

Review the diagnostic criteria and classification of plasma cell neoplastic disorders including monoclonal gammopathy of undetermined significance (MGUS), solitary plasmacytoma of bone, multiple myeloma, and extraosseous plasmacytoma. Display typical and atypical multimodality imaging features of extraosseous manifestations of multiple myeloma/plasmacytoma in the abdomen and pelvis.

TABLE OF CONTENTS/OUTLINE

Review the diagnostic criteria and classifications of plasma cell neoplasms and their clinical features. Background literature review on the incidence and epidemiology of extraosseous manifestations of multiple myeloma including prevalence of individual organ involvement. Display multimodality imaging examples of extraosseous multiple myeloma in the abdomen and pelvis. Illustrative examples utilizing CT, MRI, PET CT and US will display the typical and atypical imaging appearances of myeloma/plasmacytoma in liver, small bowel, kidney, ovary, testicle and lymph nodes.

GI114-ED-X

The Many Faces of Postoperative Colon: A Review of Normal Findings, Pitfalls, and Complications

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Nicolas A. Almeida SR, MD, Madrid, Spain (*Presenter*) Nothing to Disclose
Elena Canales, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Cristina Gonzalez Gordaliza, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Ruben Eduardo Pacios Blanco, MD,PhD, Ponferrada, Spain (*Abstract Co-Author*) Nothing to Disclose
Luis Gorospe-Sarasua, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Jose Acosta Batlle SR, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Agustina Vicente Bartulos, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

• To learn the different types of colorectal resections performed in colonic surgery. • To recognize the normal post-operative image findings of the colon and avoid potential pitfalls. • To use a correct lexicon when describing the post-operative changes. • Identify the most common complications of these surgical procedures. • Develop a systematic approach to read the radiological explorations and avoid potential errors.

TABLE OF CONTENTS/OUTLINE

1)Review of the normal anatomy of the colon and related organs. 2) Discuss the different imaging modalities and protocols to evaluate the postoperative colon. 3) Types of colonic surgeries and surgical technique with the normal post-operative findings and pitfalls. 4) A case based review of common and some uncommon complications of colonic surgery. 5) A systematic approach to review these explorations. 6) Conclusion: The evaluation of the post-operative colon can be challenging for the radiology trainee and even the specialist. Knowing the surgical technique, the normal post-surgical findings and complications is crucial for evaluating these explorations. Furthermore using systematic approach may help to avoid errors.

GI115-ED-X

Creeping Fat: The Story So Far

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Yaqi Shen, PhD, MD, Wuhan, China (*Abstract Co-Author*) Nothing to Disclose
Yucheng Hai, Wuhan, China (*Presenter*) Nothing to Disclose
Ziling Zhou, Wuhan , China (*Abstract Co-Author*) Nothing to Disclose
Daoyu Hu, Wuhan, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

15084915705@163.com

TEACHING POINTS

1. To give an overview of Creeping Fat. 2. To show the imaging features of Creeping Fat in Crohn's disease. 3. To present other diseases that may have the phenomenon of Creeping Fat.

TABLE OF CONTENTS/OUTLINE

1. Introduction of Creeping Fat. 2. New member of the organ: anatomy and physiology of the mesentery. 3. Gross morphological changes of Creeping Fat. 4. Pathology features of Creeping Fat. 5. Creeping Fat and its relevance to CD. 6. Creeping Fat as a clinical target in CD: Diagnosis and Treatment. 7. General imaging features of Creeping Fat in CD: a. Barium Studies (BS) features. b. Magnetic Resonance Imaging (MR) features. c. Computed Tomography (CT) features. d. Ultrasonography (US) features. 8. Mimics: a. Ulcerative colitis. b. Diverticulitis. c. Epiploic appendagitis. d. Intraperitoneal perforation. e. Obesity (visceral adiposity).

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI116-ED-X

The Role of Imaging in Quantitative Assessment of Hepatic Steatosis in Nonalcoholic Fatty Liver Disease: Focus on Quantitative Ultrasound Approaches

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Amir M. Pirmoazen, MD, Stanford, CA (*Presenter*) Nothing to Disclose
Aman Khurana, MD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Andreas M. Loening, MD, PhD, San Francisco, CA (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV Consultant, ReCor Medical, Inc
Ahmed El Kaffas, PhD, Palo Alto, CA (*Abstract Co-Author*) Co-founder, Oncoustics
Aya Kamaya, MD, Stanford, CA (*Abstract Co-Author*) Royalties, Reed Elsevier; Researcher, Koninklijke Philips NV; Researcher, Siemens AG

For information about this presentation, contact:

apirmoazen@stanford.edu

TEACHING POINTS

The purpose of this exhibit is: To review the pathophysiology and epidemiology of nonalcoholic fatty liver disease (NAFLD) To provide a historical review of the implementation of imaging methods in detecting and monitoring hepatic steatosis To describe clinical studies on quantitative ultrasound approaches; their clinical implications and their potential in becoming the imaging method of choice for widespread use in patients suspected or with NAFLD

TABLE OF CONTENTS/OUTLINE

NAFLD Definition Epidemiology Pathophysiology Complications Clinical importance of early detection Management Differentiating NAFLD versus nonalcoholic steatohepatitis (NASH) Qualitative imaging methods to assess hepatic steatosis Quantitative imaging methods to assess hepatic steatosis MRS derived fat fraction MRI- Proton Density Fat Fraction CT-Single energy and dual energy Quantitative ultrasound Quantitative Ultrasound approaches in hepatic steatosis Speed of sound Attenuation coefficient Backscatter coefficient Controlled attenuation parameter Computerized hepatorenal index Acoustic structure quantification Statistical model-based imaging techniques Sample cases Future directions summary

GI117-ED-X

Diffuse Enlargement of the Pancreas: Not Always Autoimmune Pancreatitis

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Ming He, Beijing, China (*Presenter*) Nothing to Disclose
Liang Zhu, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Huadan Xue, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Zhengyu Jin, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

3771774431@qq.com

TEACHING POINTS

1. The diffuse enlargement of the pancreas is not the specific sign for autoimmune pancreatitis.2. Several malignant conditions can present as diffuse enlargement of the pancreas including pancreatic ductal adenocarcinoma(PDAC), pancreatic neuroendocrine tumor(pNET), primary pancreatic lymphoma(PPL) and acinar cell carcinoma(ACC), extramedullary plasmacytoma and metastases.3. The enhancement pattern, clinical and lab examination are helpful for the differential diagnosis. However, the differential diagnosis can sometimes be challenging and require histologic evaluation.4. Awareness of these rare presentation of these diseases and key distinguishing imaging characteristics is important to establish an accurate working differential diagnosis.

TABLE OF CONTENTS/OUTLINE

1.Diseases that presented as diffuse enlargement of the pancreas1.1 Benign conditions(inflammatory disease)1.1.1 Autoimmune pancreatitis1.1.2 Acute pancreatitis1.2 Malignant conditions(malignant tumors)1.2.1 Pancreatic ductal adenocarcinoma1.2.2 Pancreatic neuroendocrine tumor1.2.3 Primary pancreatic lymphoma1.2.4 Acinar cell carcinoma1.2.5 Axtramedullary plasmacytoma1.3 Miscellaneous diseases1.3.1Secondary/metastases2. Key imaging features of each of these diseases 3. Differential key points

GI118-ED-X

Abdominoperineal Resection and Beyond

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Nicolas A. Almeida SR, MD, Madrid, Spain (*Presenter*) Nothing to Disclose
Elena Canales, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Ruben Eduardo Pacios Blanco, MD,PhD, Ponferrada, Spain (*Abstract Co-Author*) Nothing to Disclose
Alfonso Lopez-Frias Lopez-Jurado, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Pablo Marazuela Garcia, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Jose Acosta Batlle SR, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

The purpose of this exhibit is to discuss abdominoperineal resection procedure in order to be able to identify the normal postoperatives appearances, differentiate potential post surgical complications and tumour recurrence

TABLE OF CONTENTS/OUTLINE

1. Review surgical procedural details and indications 2. Recognize the normal post operatives appearances 3. Review common complications 4. Differenciate characteristic findings of postoperative presacral soft tissue from tumor recurrence and how to best image them.

Printed on: 10/29/20

GI119-ED-X

The Blurred Diagnosis: Fat Stranding Patterns, Differentials, and Pitfalls - What Do Residents Need to Know?

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Christian A. Cabrera, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose
Hugo Torres Rodriguez, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Sergio A. Criales Vera, MD, Mexico, Mexico (*Abstract Co-Author*) Nothing to Disclose
Andres F. Herrera Jimenez, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Maria de la Luz Jimenez Camacho, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

chrisabadcg@gmail.com

TEACHING POINTS

- Fat stranding refers to an abnormally increased attenuation in fat, and is one of the most common CT findings in the scenarios of acute or chronic abdominal pain, also helpful, and frequently essential, in discovering the underlying cause of the pain. - Fat stranding could be so subtle or:conspicuous, that can obscure the:primary:diagnosis, that is why residents must be a were of this tricky:finding.- The differentials and mimics should be on the table as well, and the key for the resident is to follow the logical approach to ensure the most accurate diagnosis.- Location, structures involved, associated findings of the possible entity and patient symptoms are helpful steps that we as residents can use to narrow the differential diagnosis.

TABLE OF CONTENTS/OUTLINE

TABLE OF CONTENT.-Introduction.-Easy to learn when you play a game.-Fat stranding Adjacent to the gastrointestinal tract.-Fat stranding in the mesentery and omentum. -Fat Stranding Adjacent to a Solid Organ. -Fat Stranding in the retroperitoneum.-Fat Stranding in the perirenal space-Pearls and pitfalls.-Conclusion.

GI120-ED-X

Videodefecography in the Pelvis Floor Dysfunction: Is it Still Useful?

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Guillermo Unzue, Pamplona, Spain (*Presenter*) Nothing to Disclose
Nerea Alberdi, MD, Vitoria, Spain (*Abstract Co-Author*) Nothing to Disclose
Paul Lopez, MBBS, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Loreto De Llano, Pamplona , Spain (*Abstract Co-Author*) Nothing to Disclose
Gloria Jimenez Lopez de Onate, Pamplona , Spain (*Abstract Co-Author*) Nothing to Disclose
Paula San Julian, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

gunzue@gmail.com

TEACHING POINTS

Describe the technique, indications and limitations of videodefecography. Review pathological findings of pelvis floor dysfunction correlating them with those found at MR defecography and surgery.

TABLE OF CONTENTS/OUTLINE

Functional pelvic floor abnormalities represent a common health problem. Since physical examination is not reliable, a functional assessment of rectal evacuation is essential. Videodefecography is a well established, cost-effective and widely available method to evaluate the dynamics of rectal evacuation which has been considered the image test of reference. MR defecography has become an alternative due to its lack of ionizing radiation and excellent soft tissue resolution. Thus, MRI can observe the three pelvic compartments. We study patients with pelvic floor dysfunction in our radiology department from 2015 to 2018. We review the pelvis floor anatomy as well as continence and defecation mechanisms. We analyze videodefecography technique; including necessary material, patient position, image acquisition sequences (rest, straining, evacuation and post-evacuation), anatomical references (anorrectal angle, PCL line, H & M lines) and measurements. We make a pictorial review of the most commonly seen pathologies, including rectocele/sigmoidocele, enterocele, rectal prolapse, rectal intussuspection and pelvis floor dyssynergia syndrome.

GI121-ED-X

A Call to Action - Knowledge Gaps in LI-RADS Version 2018: Engaging Radiologists, Surgeons, and Clinicians to Improve LI-RADS

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Ania Z. Kielar, MD, Shanty Bay, ON (*Presenter*) Nothing to Disclose
Mustafa R. Bashir, MD, Cary, NC (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, NGM Biopharmaceuticals, Inc; Research Grant, Madrigal Pharmaceuticals, Inc; Research Grant, Metacrine, Inc; Research Grant, Pinnacle Clinical Research; Research Grant, ProSciento Inc; Research Grant, Carmot Therapeutics; Research Grant, 1Globe Health Institute; Research Consultant, ICON plc;
Victoria Chernyak, MD,MS, Bronx, NY (*Abstract Co-Author*) Consultant, Bayer AG
Claude B. Sirlin, MD, San Diego, CA (*Abstract Co-Author*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc
Khaled M. Elsayes, MD, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose
Venkateswar R. Surabhi, MD, Sugar Land, TX (*Abstract Co-Author*) Nothing to Disclose
Matthew D. McInnes, MD, PhD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Joseph H. Yacoub, MD, Maywood, IL (*Abstract Co-Author*) Nothing to Disclose
David T. Fetzer, MD, Dallas, TX (*Abstract Co-Author*) Researcher, Koninklijke Philips NV; Researcher, Siemens AG; Consultant, Koninklijke Philips NV; Speakers Bureau, Koninklijke Philips NV; Speakers Bureau, Siemens AG ; ;
Kathryn J. Fowler, MD, San Diego, CA (*Abstract Co-Author*) Consultant, 12 Sigma Technologies; Researcher, Nuance Communications, Inc; Contractor, Midamerica Transplant Services; ;
Elhamy R. Heba, MBBCh, MD, Fayetteville, NY (*Abstract Co-Author*) Nothing to Disclose
Islam H. Zaki, MBBCh, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Andrea S. Kierans, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Elizabeth M. Hecht, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

aniakielar@gmail.com

TEACHING POINTS

1. LI-RADS is a standardized system for reporting liver observations in patients 'at risk' for developing hepatocellular carcinoma (HCC). - This system was created by radiologists in conjunction with other specialists caring for patients with HCC. - It is a living document, updated continuously to incorporate new medical evidence - It was created for use by all radiologists, in all types of practice settings 2. Despite advances, there are gaps in knowledge and pitfalls associated with LI-RADS version 2018 Relevance to practice: Informing and engaging the greater community of physicians caring for patients at risk for HCC about current knowledge gaps will assist in aligning future research and investigations, while improving LI-RADS and optimizing patient care.

TABLE OF CONTENTS/OUTLINE

The top 10 knowledge gaps, as identified and iterated upon by the LI-RADS Evidence Based working group, will be reviewed with ideas presented, with imaging examples, for potential future research (see PDF). A review of the literature existing currently for each general topic will be presented. Highlighting knowledge gaps will assist in aligning future investigations while improving Li-RADS and optimizing patient care.

GI122-ED-X

Colonic Interposition after Esophagectomy in Barium Studies: A Series of Awe-inspiring Esophagograms

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Monica Munoz-Lopez, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose
Ricardo Martinez Martinez, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Gisela Munoz, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Yumi Kimura Sandoval, BMBS, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Hee Jung Choi, BMedSc, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Dulce A. Sanchez Nava, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

1. To review the current indications for performing esophageal replacement surgery with colonic interposition. 2. To depict at a glance the surgical techniques for colonic interposition surgery. 3. To explain the utility and key imaging findings of barium esophagogram in the post-operative follow-up of these patients. 4. To demonstrate the most common post-operative complications assessed by barium esophagography.

TABLE OF CONTENTS/OUTLINE

1. Indications for Esophageal Replacement. 2. Surgical Techniques for Colonic Interposition. 3. Review of Imaging Findings in Barium Esophagogram: Sample Cases. 4. Postoperative Complications.

Printed on: 10/29/20

GI123-ED-X

Crohn's Disease: Pictorial Review of the CT and MR Findings, Standardized Terminology, and Management Guidelines from the 2018 Consensus Recommendations

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Amanda M. Romesberg, DO, Lexington , KY (*Presenter*) Nothing to Disclose
Joseph W. Owen, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Andres R. Ayoob, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Rashmi T. Nair, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Halemane S. Ganesh, MD, Sheffield, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Adrian A. Dawkins, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Scott D. Stevens, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
James T. Lee, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Classify the imaging findings of active inflammatory Crohn's disease of the small bowel. Differentiate the imaging findings of penetrating disease and mesenteric inflammation associated with Crohn's disease. Recognize and describe the extra-intestinal manifestations of Crohn's disease detectable on CT and MR enterography

TABLE OF CONTENTS/OUTLINE

Inflammation and Stricture of the Small Bowel • Segmental mural enhancement • Wall thickening • Intramural edema • Stricture: without upstream dilation, with mild upstream dilation, with moderate to severe upstream dilation • Ulceration • Sacculation • Diminished motility Penetrating Disease • Simple fistula • Complex fistula • Sinus tract • Perianal fistula • Inflammatory mass • Abscess Mesenteric inflammation • Perienteric edema • Engorged vasa recta • Fibrofatty proliferation • Mesenteric venous thrombosis • Adenopathy Extra-inestinal Manifestations of Crohn Disease • Nephrolithiasis • Cholelithiasis • Pancreatitis • Primary sclerosing cholangitis • Sacroiliitis • Avascular necrosis By using standardized terminology to categorize and classify the imaging findings of Crohn's disease on CT and MR, radiologists can develop meaningful report impressions that referring clinicians can easily interpret, and which impact management.

GI124-ED-X

What Radiologists Should Do to Perform an Abdominal MR Exam on Severe Dyspneic Patients

All Day Room: GI Community, Learning Center Digital Education Exhibit

FDA Discussions may include off-label uses.

Participants
Francois Legou, MD, Paris, France (*Presenter*) Nothing to Disclose
Julie Poujol, PhD, Vandoeuvre-les-Nancy, France (*Abstract Co-Author*) Employee, General Electric Company
Vincent Barrau, MD, St Denis, France (*Abstract Co-Author*) Nothing to Disclose
Pascal Roux, MD, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Eric G. Pessis, MD, St Denis, France (*Abstract Co-Author*) Nothing to Disclose
Ty A. Cashen, MD, PhD, Madison, WI (*Abstract Co-Author*) Employee, General Electric Company
Daniel Litwiller, PhD,MBA, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Kang Wang, PhD, Madison, WI (*Abstract Co-Author*) Employee, General Electric Company
Ersin Bayram, PhD, Houston, TX (*Abstract Co-Author*) Employee, General Electric Company

For information about this presentation, contact:

flegou@ccnradio.fr

TEACHING POINTS

To describe and illustrate novel MR acquisition techniques for challenging dyspneic patients:- Respiratory triggered and navigated sequences are used to overcome this issue with limitations : either T1w injected acquisition cannot be interpreted properly because early arterial phases are missed, either T2w acquisition are quite long to be included in MR exam in addition to failed breath hold acquisitions.- Novel MR sequences (LAVA Stack-Of-Star sequence designed for free-breathing T1-weighted Contrast-enhanced multiphase imaging and an enhanced Single-Shot FSE for a 1-minute free-breathing T2-weighed imaging) have to be used for dyspneic patients for a reliable MR exam.

TABLE OF CONTENTS/OUTLINE

-Challenges to perform an abdominal MR exam and the alternatives to breath-hold-acquisitions for dyspneic patients. Recall to the consequences of repeated failed breath-hold sequences on exam image quality and the new issues due to respiratory triggered or navigated sequence instead: no correct arterial and venous phases for enhanced liver lesion leading to an unconfident diagnosis, degraded image quality- Description of two novel sequences: LAVA Stack-Of-Star and an enhanced Single-Shot FSE free-breathing T2-weighed imaging.- Cases to highlight the clinical pertinence and added value of these novel sequences with a real clinical need

GI125-ED-X

Policing the Abdomen: Imaging of the Greater Omentum on CT and MRI

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Tomoya Nishiyama, MD, Tokyo, Japan (*Presenter*) Nothing to Disclose
Jay Starkey, MD, Portland, OR (*Abstract Co-Author*) Nothing to Disclose
Masaki Matsusako, MD, PhD, Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasuyuki Kurihara, MD, Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

The Greater omentum is famously known as the "abdominal policeman". However, little attention has been devoted to its radiological imaging, including of procedure-related complications. The aim of this exhibit is to demonstrate the movements, the appearance after usage as wound packing, and related complications and pitfalls.

TABLE OF CONTENTS/OUTLINE

1. To demonstrate normal and variant anatomy of the greater omentum 2. Case based review of the greater omentum demonstrating the following topics:- Findings suggestive of the wandering or packed greater omentum include an unusual location of a fat density mass to which feeding and draining vessels anastomose with omental vessels.- The wandering greater omentum in a patient with ruptured/resected HCC, with herniation and with abscess- Typical cases of the greater omentum packing procedure for gastrointestinal perforation; dead space following tumor resection; inflammation following median sternotomy- Complications, including active bleeding from the packed greater omemtum, adhesion of anterior and posterior gastric wall after the packing procedure for perforated gastritis, pelvic drainage tube malfunction that is covered by the packed greater omentum

GI126-ED-X

Endoanal Ultrasonography of Anal Disease: A Primer for Abdominal Radiologists

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Guillermo Unzue, Pamplona, Spain (*Presenter*) Nothing to Disclose
Paul Lopez, MBBS, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Nerea Alberdi, MD, Vitoria, Spain (*Abstract Co-Author*) Nothing to Disclose
Loreto De Llano, Pamplona , Spain (*Abstract Co-Author*) Nothing to Disclose
Gloria Jimenez Lopez de Onate, Pamplona , Spain (*Abstract Co-Author*) Nothing to Disclose
Paula San Julian, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

gunzue@gmail.com

TEACHING POINTS

Describe the technique, indications and limitations of endoanal ultrasound. Review anal fistula and abscesses, anal carcinoma and anal incompetence findings in US, correlating them with MRI and surgery.

TABLE OF CONTENTS/OUTLINE

Anal pathologies, especially fistula, are common disorders in the lower gastrointestinal tract. They show a high rate of recurrence. As a result, precise preoperative diagnosis and classification is essential. CT have several limitations. Despite providing excellent anatomic and pathologic information, MRI it's not a first-line imaging tool due to its poor availability. Endoanal ultrasound is a real time cross-sectional imaging modality, due to absence of radiation, availability and cost-effectiveness. We study patients with anal disease in our radiology department from 2014 to 2018. We review anal anatomy focusing our attention on the components of each region. We analyze endoanal ultrasonography procedure; including indications and limitations, type of transductor, patient position, acquisition planes (superficial, mid and deep level) and anatomical structures (puborectalis muscle, internal and external anal sphincter and intersphincteric fat). We make a pictorial review of the most commonly seen pathologies; such as intersphincteric and transsphincteric fistula, complex fistula, abscess, fecal incontinence and anal carcinoma.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES — TOGETHER

GI127-ED-X

Tracking the Fluid: A Resident's Guide to Interpret Route of Spread of Peritoneal Pathologies

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Minu Mohandas, MBBS, Thiruvananthapuram, India (*Presenter*) Nothing to Disclose
Sreeraj Nadarajan, MBBS, Trivandrum, India (*Abstract Co-Author*) Nothing to Disclose
Nita Hubert, Thiruvananthapuram, India (*Abstract Co-Author*) Nothing to Disclose
Laly Jose, Thiruvananthapuram, India (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ravishinminu@hotmail.com

TEACHING POINTS

To review the complex imaging anatomy of peritoneum, including peritoneal spaces and ligaments with corresponding CT/ MR images.To describe the route of spread of diseases across the potential spaces and ligaments.To localise site of collections in respective peritoneal compartments and guide drainage.To understand the surgical implications of involvement of peritoneal ligaments and thereby vascular invasion in various malignancies.

TABLE OF CONTENTS/OUTLINE

Basic embryology of peritoneumImaging anatomy of peritoneal ligamentsImaging anatomy of peritoneal spacesRoute of spread of pathologiesSample cases showing route of spreadSample cases showing importance of localisation of fluid collections and guiding drainageSample cases showing involvement of peritoneal ligaments in various malignancies and its surgical implicationsConclusion

GI128-ED-X

Appendix Spectrum: Common and Uncommon Pathology

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Ana M. Alves, MD, MMed, Porto, Portugal (*Presenter*) Nothing to Disclose
Joana Pinto, MD, Porto, Portugal (*Abstract Co-Author*) Nothing to Disclose
Joao F. Amorim, MD, MSc, Porto, Portugal (*Abstract Co-Author*) Nothing to Disclose
Willian Schmitt, MD, Porto, Portugal (*Abstract Co-Author*) Nothing to Disclose
Raquel M. Maia, MD, Matosinhos, Portugal (*Abstract Co-Author*) Nothing to Disclose
Manuela Franca, MD, Porto, Portugal (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

anamargarida.ca@gmail.com

TEACHING POINTS

The purpose of this exhibit is: - Review the normal anatomy and variable position of the appendix; - Illustrate the characteristic imaging findings of common and uncommon diseases of the appendix in different modalities; - Clarify important radiological differences between acute appendicitis and other appendiceal abnormalities.

TABLE OF CONTENTS/OUTLINE

1. Appendix anatomy 2. Imaging findings of common and uncommon appendix pathologies: 2.1 Appendicitis: - Uncomplicated acute appendicitis - Complicated acute appendicitis - Tip appendicitis - Stump appendicitis - Crohn's appendicitis - Appendicitis-containing hernia 2.2 Benign tumour and tumour like conditions: - Mucocele - Mucinous cystadenoma 2.3 Malignant tumours: - Carcinoid - Mucinous adenocarcinoma - Non-Mucinous adenocarcinoma - Lymphoma

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI129-ED-X

Small Bowel Masses: A Pictorial Review

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Identified for RadioGraphics

Participants
Rahul Jasti, MBBS, Richmond, VA (*Presenter*) Nothing to Disclose
Laura R. Carucci, MD, Midlothian, VA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

rahul.jasti@vcuhealth.org

TEACHING POINTS

To accurately identify and characterize small bowel masses on cross-sectional examinations. Describe pertinent imaging features of common small bowel neoplasms and common mimickers. Most small bowel tumors are clinically silent for long periods. Nearly half are found incidentally during surgery or an investigation to visualize the intestine for other reasons. Common symptoms include abdominal pain, nausea, weight loss, and bleeding. The larger the tumor, the more likely the patient will experience symptoms of bowel obstruction. Main radiographic feature of benign small bowel tumors is of a single intraluminal filling defect or a soft tissue mass. Small bowel lesions may be multiple in certain syndromes such as intestinal polyposis syndromes

TABLE OF CONTENTS/OUTLINE

Small Bowel Imaging Techniques: General description. Benign masses of Small Bowel: Adenomas GIST Lipoma Polyps Hamartoma Neurogenic and vascular tumors Polyposis syndromes Malignant tumors of Small Bowel: Adenocarcinoma Malignant GIST Carcinoid Lymphoma Metastases Serosal implants Sarcoma Other 'mass like lesions' of the small bowel Small bowel hematoma Inflammatory (i.e. Meckels Diverticulum) Small bowel diverticulitis Summary

GI130-ED-X

Clinical Approach and Pictorial Review of Small Bowel Thickening: When Crohn's Disease and Malignancy Are Not the Diagnostic Answers

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Elena Marin-Diez, MD, Santander, Spain (*Presenter*) Nothing to Disclose
Javier Azcona Saenz, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Ana Belen Barba Arce, MD, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Elena Yllera Contreras, MD, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Juan Crespo, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Raul D. Pellon, MD, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Sara Sanchez Bernal, MD, Salamanca, Spain (*Abstract Co-Author*) Nothing to Disclose
Yasmina Lamprecht, MBBS, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Enrique Montes, MD, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Mercedes Acebo, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Francisco J. Gonzalez, MD,CMD, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

elenamarindiez@gmail.com

TEACHING POINTS

To explain the definition of small bowel thickening and the imaging findings on different modalities. To study the patterns of abnormal small bowel at MDCT. To provide an image-based review of common and uncommon causes of small bowel thickening, excluding Crohn´s disease and malignancy.

TABLE OF CONTENTS/OUTLINE

I. Definition and patterns of small bowel thickening: a) Small bowel thickening on barium exam, US, CT (including CT enterography) and MRI. b) Pattern approach to abnormal small bowel at MDCT: - Degree of thickening. - Symmetry or asymmetry of thickening. - Mural enhancement. - Length of involvement: focal, segmental and diffuse. II. Case-based review of small bowel thickening, excluding Crohn´s disease and malignancy: a) Immune-mediated: - Eosinophilic gastroenteritis. - Anisakiasis. - Graft-versus-host disease (GVHD). b) Infections: - Diverticulitis (including Meckel´s diverticulitis). - Tuberculosis. c) Vascular: - Intestinal ischemia. - Vasculitis. d) Toxicity: - Radiation enteritis. - Chemotherapy-induced enteritis. e) Others: - Ectopic pancreatic tissue. - Foreign bodies. - Lymphoma as mimicker. III. Differential diagnosis algorithm including clinical, laboratory and imaging findings.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES — TOGETHER

GI131-ED-X

Wanderlust in the Abdomen and Pelvis: Imaging Overview of Wandering Spleen

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Angelica Patino, MD, Springfield, MA (*Presenter*) Nothing to Disclose
Daniel A. Hynes, MD, Springfield, MA (*Abstract Co-Author*) Nothing to Disclose
Daniel Kowal, MD, Sturbridge, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

angelica.patinoMD@baystatehealth.org

TEACHING POINTS

The goals for the exhibit are: 1.To present a rare condition through a multimodality overview (NM, CT, US) 2.To present cases with complications of wandering spleen (torsion of vascular pedicle with no infarct, partial infarct, complete infarct)

TABLE OF CONTENTS/OUTLINE

Introduction: Congenital vs. acquired Cases of uncomplicated wandering spleen: (X-ray demostrating hypermobility of the spleen, NM, US and CT showing enlarged ectopic spleen Cases of complicated wandering spleen (Vascular torsion of the pedicle with no infarct, partial infarct and complete infarct) Conclusions

Printed on: 10/29/20

GI132-ED-X

Pancreatic Cancer Imaging: A New Look at an Old Problem

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Linda C. Chu, MD, Lutherville, MD (*Presenter*) Nothing to Disclose
Seyoun Park, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Satomi Kawamoto, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Alejandra Blanco, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Shahab Shayesteh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Saeed Ghandili, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Daniel Fadaei Fouladi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Alan Yuille, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ralph H. Hruban, Baltimore, MD (*Abstract Co-Author*) Board Member, miDiagnostics
Kenneth Kinzler, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bert Vogelstein, MD, Baltimore, MD (*Abstract Co-Author*) Founder, Personal Genome Diagnostics, Inc; Founder, Thrive Scientific; Advisor, Sysmex Corporation; Advisor, Eisai Co, Ltd; Advisor, CAGE; Advisor, Neophore; Advisor, Nexus; License agreement, Personal Genome Diagnostics, Inc; License agreement, Thrive Scientific; License agreement, Sysmex Corporation; License agreement, Eisai Co, Ltd; License agreement, CAGE; License agreement, Neophore; License agreement, Nexus
Elliot K. Fishman, MD, Owings Mills, MD (*Abstract Co-Author*) Institutional Grant support, Siemens AG; Institutional Grant support, General Electric Company; Co-founder, HipGraphics, Inc

For information about this presentation, contact:

lindachu@jhmi.edu

TEACHING POINTS

1. Application of radiomics to pancreatic cancer imaging can provide important information in tumor detection, tumor classification, and disease prognostication. 2. Recent advances of deep learning have shown promise in automatic organ segmentation and tumor detection. 3. Cinematic rendering and other advanced visualization techniques can provide valuable information in treatment planning.

TABLE OF CONTENTS/OUTLINE

1. Brief overview of current state-of-the-art pancreatic imaging, including: a. Recommended protocol b. Recommended template 2. Describe current areas of need and potential solutions: a. Biomarkers for tumor classification and prognostication - Radiomics b. Computer aided diagnosis to reduce misdiagnosis - Deep learning c. Advanced visualization techniques for treatment planning - Cinematic rendering 3. Review current applications of radiomics in pancreatic cancer imaging: a. Tumor detection b. Tumor classification c. Disease prognostication 4. Review current applications in deep learning in computer aided diagnosis of pancreatic pathology: a. Automatic organ segmentation b. Automatic detection of pancreatic tumors 5. Review cinematic rendering and other advanced visualization techniques in pretreatment planning

GI133-ED-X

Hepatic Hydatid Disease: What's in a Name? A Review of the Radiological Differences Between Alveolar (Echinococcus Multilocularis) and Cystic (Echinococcus Granulosus) Hydatid Disease for the Radiologist in Non-Endemic Areas

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Anisha Bhagwanani, MA,BMBCh, London, United Kingdom (*Presenter*) Nothing to Disclose
Manil Chouhan, FRCR,PhD, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Peter Chiodini, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Zahir Amin, FRCR, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

anisha.bhagwanani@nhs.net

TEACHING POINTS

Hepatic hydatid disease is synonymous with the more widely prevalent cystic form (Echinococcus granulosus), but incidence of alveolar hydatid disease is rising and the implications for radiological practice are very different. This educational exhibit aims to provide a comparative review of alveolar and cystic hydatid disease, specifically: 1. An overview of differing epidemiology and increasing relevance of alveolar hydatid disease in the Western world 2. The main imaging features of alveolar hydatid disease and how these differ from cystic hydatid disease 3. The distinguishing features of alveolar hydatid from disease mimics, especially liver malignancy 4. The role of the radiologist in disease management and how this differs from cystic hydatid disease

TABLE OF CONTENTS/OUTLINE

- Epidemiology of alveolar hydatid disease and how this differs from cystic hydatid disease - A comparative imaging review of the pathological evolution of alveolar and cystic hydatid disease - Comparison of the imaging features of alveolar and cystic hydatid disease across different modalities - Sample cases and disease mimics - Disease complications and the differing role of image-guided intervention in alveolar hydatid disease - The comparative role of imaging in the assessment of alveolar and cystic hydatid disease response - Summary

GI134-ED-X

Peritoneal Disease and Peritoneal Carcinomatosis Index (PCI): The Role of the Radiologist

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Pooja R. Kembhavi, MBBS, Mumbai, India (*Abstract Co-Author*) Nothing to Disclose
Delnaz R. Palsetia JR, MBBS, Mumbai, India (*Presenter*) Nothing to Disclose
Suman Kumar, Mumbai, India (*Abstract Co-Author*) Nothing to Disclose
Anuradha Chandramohan, MD,FRCR, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Aparna Katdare, Mumbai, India (*Abstract Co-Author*) Nothing to Disclose
Akshay D. Baheti, MD, Mumbai, India (*Abstract Co-Author*) Nothing to Disclose
Avanish Saklani, Mumbai , India (*Abstract Co-Author*) Nothing to Disclose
Ashwin DeSouza, Mumbai , India (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

poojak1693@gmail.com

TEACHING POINTS

1. Review relevant peritoneal anatomy and modes of spread 2. Understand PCI calculation 3. Review newer methods of peritoneal disease management 4. Summarize tumor-wise indications and PCI cut-offs for surgical procedures

TABLE OF CONTENTS/OUTLINE

1. Peritoneal Anatomy in relation to assessment of PCI 2. Indices used for grading peritoneal disease extent and methods of calculating PCI 3. Use of various imaging modalities (CT, MRI, PET/CT) for calculating PCI 4. Advances in peritoneal disease management 5. Tumor-wise indications and PCI cut-offs for surgical procedures, and the role of the radiologist in the same

GI135-ED-X

CT Staging of Pancreatic Adenocarcinoma: A Focus on Structured Reporting

All Day Room: GI Community, Learning Center Digital Education Exhibit

FDA Discussions may include off-label uses.

Participants
Steven Calamita, MD, Lebanon, NH (*Presenter*) Nothing to Disclose
Christina Y. Jeong, MD, White River Junction, VT (*Abstract Co-Author*) Nothing to Disclose
Michael J. Tsapakos, MD, PhD, Lebanon, NH (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

steven.a.calamita@hitchcock.org

TEACHING POINTS

Review local and regional vessel involvement to characterize a pancreatic adenocarcinoma as resectable, boarderline resectable, or locally advanced based on the most recent National Comprehensive Cancer Network (NCCN) staging criteria. Discuss how structured reporting can help generate comprehensive and concise radiologic reports to help define operability.

TABLE OF CONTENTS/OUTLINE

• Relate staging to operability and survivability of Pancreatic adenocarcinoma (PDA) • 5-year survival at presentation • Review TMN and National Comprehensive Cancer Network (NCCN) criteria • Review relevant visceral and vascular anatomy • Describe pancreatic protocol CT and use for PDA staging • Review NCCN criteria for staging with examples demonstrating various degrees of tumor-vascular contact • Celiac axis (CA) • Superior mesenteric artery (SMA) • Common hepatic artery (CHA) • Superior mesenteric vein (SMV) • Portal vein (PV) • Supporting findings • Thrombus • Deformity • Caliber narrowing • Application of structured reporting to PDA staging

Printed on: 10/29/20

GI136-ED-X

Under Pressure! The "State-of-the-Art" of Portal Hypertension

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Yuri R. Medeiros, Barueri, Brazil (*Presenter*) Nothing to Disclose
Juliana C. Yoshitani, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Rafael A. Santiago, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Aldo M. Araujo Alves, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Roberto Blasbalg, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Fernanda G. Velloni, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yurircm@hotmail.com

TEACHING POINTS

1. To review the physiopathology and the main causes of portal hypertension, usinggraphic illustrations in a didactic approach.2. To illustrate the main pathology features observed on CT and MRI through imagesacquired by the most recent techniques and sequences that allow 3D reconstructionsand better visualization of the findings.3. To identify the main related complications and difficulties involved in themanagement of these patients.4. To understand the therapeutic principles and to emphasize the impact of imagingfindings on the decision-making process of the referring physician.5. To highlight the key points to be included in the radiologic report.6. To discuss the applicability of new imaging techniques in this context.

TABLE OF CONTENTS/OUTLINE

1. Definition and background2. Physiopathology3. Causes a. Prehepatic b. Intrahepatic c. Posthepatic4. Imaging findings5. Complications6. Therapeutic options7. Key points to be included in the radiologic report8. Future perspectives9. Conclusion and take-home messages

GI137-ED-X

Percutaneous Treatment of Liver Lesions: How Can Contrast-Enhanced Ultrasonography Help?

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Marta Sola, MD, Sabadell, Spain (*Presenter*) Nothing to Disclose
Amalia Gonzalez Lopez, Sabadell, Spain (*Abstract Co-Author*) Nothing to Disclose
Beatriz Consola, MD, Sabadell, Spain (*Abstract Co-Author*) Nothing to Disclose
Jordi Puig, Sabadell, Spain (*Abstract Co-Author*) Nothing to Disclose
Francesc Novell Teixido, MD, Sabadell, Spain (*Abstract Co-Author*) Nothing to Disclose
Carlota C. Rodriguez, MD, Terrassa, Spain (*Abstract Co-Author*) Nothing to Disclose
Eva Ballesteros Gomiz, MD, Mollet del Valles, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

msolag@tauli.cat

TEACHING POINTS

To describe the principal applications, advantages and contraindications of contrast-enhanced ultrasonography in interventional US. To show the usefulness of contrast-enhanced ultrasonography (CEUS) before, during and after percutaneous treatment of hepatic tumors, with special emphasis on hepatocellular carcinoma.

TABLE OF CONTENTS/OUTLINE

- Indications and contraindications of microbubble UCAs - Main advantages of CEUS - Usefulness of CEUS in percutaneous treatment of liver lesions: • Before treatment: characterization (LI-RADS for CEUS), selecting the best site for biopsies and staging (by determining whether portal thrombosis is tumor-related) • During treatment: identifying the lesion, enabling correct needle placement • After treatment: evaluating the response, detecting and following up complications

GI138-ED-X

Imaging in Liver Fibrosis: Evolving from the Subjective to the Objective

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Luis E. Cabral Paiva, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Nathalia Regia Vieira Andrade, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Laura Travitzki, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Mariana d. Estrela, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Beatriz Morais e Rodrigues da Cunha, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Virginia d. Goncalves, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Abdalla Y. Skaf, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Hilton M. Leao Filho, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

dudumedufpb@gmail.com

TEACHING POINTS

Assessment of liver fibrosis, mainly focused on MRI, for objective evaluation.Compare objective methods and subjective analysis by different image methods .Illustrate the main differential techniques with didactic examples.Discuss about advantage and disadvantage of each method.Main objective methods included: Elastography MRI;DWI;T1 map;T1 Rho;T2 map;Hepatobiliary-specific MR contrast;SWI;Texture analysis.Benefits of the results against laboratory and clinical assessment.

TABLE OF CONTENTS/OUTLINE

Liver fibrosis occurs due to repetitive injury from various causes, including viral hepatitis, alcohol abuse, NASH, autoimmune hepatitis, biliary and vascular obstruction.The processes is usually silent, progressive and potentially reversible, making early diagnosis useful for treatment in order to halt progression for complications. In the near past, morphological signs of cirrhosis were evaluated by image in a dichotomous way (present or absent), and the gold standard for diagnosis and staging was by liver biopsy, which is not free of complications, thus corroborating the need for a quantitative noninvasive analysis.We present several noninvasive image methods for quantification liver fibrosis, focused in early diagnosis and follow up.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI139-ED-X

Diverticular Disease of the Gastrointestinal Tract: A Pictorial Review from the Esophagus to Colon

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Maria M. Rojas-Rojas, MD, Bogota, Colombia (*Presenter*) Nothing to Disclose
Diego A. Aguirre, MD, Bogota, Colombia (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

After reviewing this educational exhibit, the learner will be able to: identify anatomy of the gastrointestinal tract and pathophysiology of diverticula formation. recognize the role of radiologic imaging in diverticular disease. Recognize the key features of diverticular disease, according to diverticulum location within the GI tract. Understand common complications and treatment of diverticular disease.

TABLE OF CONTENTS/OUTLINE

Anatomy of the gastrointestinal tract. Pathophysiology of diverticula formation. Diagnostic imaging in diverticular disease of the esophagus, stomach, small intestine and colon. Complications of diverticular disease and treatment.

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI140-ED-X

Various Faces of Pancreatic Adenocarcinoma: Atypical Imaging Features

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Hyo Jung Park, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Jae Ho Byun, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jin Hee Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seung Soo Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyoung Jung Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Moon-Gyu Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jhbyun@amc.seoul.kr

TEACHING POINTS

1) To briefly outline the typical imaging features and essential radiologic items to be evaluated in the diagnosis of pancreatic adenocarcinoma 2) To present atypical findings of pancreatic adenocarcinoma on CT and MRI and their mimickers 3) To highlight the important clues and pitfalls for accurate diagnosis of atypical pancreatic adenocarcinoma on CT and MRI 4) To establish a radiological perspective on diagnosis of pancreatic adenocarcinoma by means of a systematic approach

TABLE OF CONTENTS/OUTLINE

1) Summary of typical imaging features to suggest pancreatic adenocarcinoma (1) Typical CT and MRI findings to highly suggest pancreatic adenocarcinoma (2) Essential items to be evaluated in the diagnosis of pancreatic adenocarcinoma on CT and MRI 2) Atypical imaging features of pancreatic adenocarcinoma, their mimickers, and clues for differentiation (1) Pancreatic adenocarcinoma showing iso-attenuation to the normal parenchyma at CT (2) Pancreatic adenocarcinoma with prominent cystic portion (3) Pancreatic adenocarcinoma with diffuse involvement of the pancreas (4) Pancreatic adenocarcinoma with calcification (5) Hepatoid adenocarcinoma of the pancreas (6) Synchronous multifocal pancreatic adenocarcinoma in the pancreas 3) Suggestion for a systematic approach in diagnosis of pancreatic adenocarcinoma and differentiation from its mimickers

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI141-ED-X

Dealing with the Epidemic: A Review of the Abdominal Imaging Findings of Recreational Drug Abuse

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Magna Cum Laude
Identified for RadioGraphics

Participants
Joseph Mansour, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Affan Umer, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Kenneth S. Zurcher, MD, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose
Maria Zulfiqar, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Allen P. Heeger, DO, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier

For information about this presentation, contact:

joseph.mansour@health.slu.edu

TEACHING POINTS

1. List the various abdominal complications of recreational drug abuse that may be detected on imaging 2. Describe the pathophysiology resulting in complications of recreational drug abuse 3. Illustrate the spectrum of abdominal imaging findings of recreational drug abuse

TABLE OF CONTENTS/OUTLINE

1. Epidemiology 2. Opiates a. Fecal impaction and bowel perforation b. Acquired viral infections c. Hematogenous dissemination of infection 3. Cocaine a. Bowel ischemia and infarction b. Vascular complications 4. Amphetamines a. 'Speed kidney' b. Bowel ischemia and infarction 5. Cannabis and Synthetic Marijuana a. Pancreatitis b. Duodenal perforation 6. Ecstasy a. Hemoperitoneum 7. Toluene a. Nephrolithiasis b. Renal tubular acidosis 8. Body packing 9. Summary and Conclusion SUMMARY Recreational drug abuse is a burgeoning health issue in the US with a wide variety of presentations. Diagnosing drug abuse clinically can be challenging as history is often limited or absent. Recognizing the imaging findings and related complications of recreational drug abuse allows the radiologist to suggest the etiology and guide workup and appropriate treatment.

GI142-ED-X

Imaging of the Hepatic Arterial Chemotherapy Infusion Pump and Its Complications: What the Radiologist Needs to Know

All Day Room: GI Community, Learning Center Digital Education Exhibit

FDA Discussions may include off-label uses.

Awards
Certificate of Merit

Participants
Benjamin S. Strnad, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Brian M. Gilcrease-Garcia, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Daniel R. Ludwig, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Vincent M. Mellnick, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

strnadb@wustl.edu

TEACHING POINTS

Hepatic arterial infusion (HAI) pump delivery of chemotherapy is an important locoregional treatment for unresectable hepatic malignancy. Successful HAI pump-catheter placement and treatment delivery require accurate perioperative assessment of the arterial anatomy and targets of hepatic arterial perfusion. Anatomic variation of the hepatic arterial blood supply has significant implications for the surgical technique. Complications of HAI therapy include hepatic arterial and catheter tip related complications, distal arterial and biliary complications, and pump pocket complications. Many of these complications may be clinically occult. The radiologist, therefore, plays an important role in assessment for HAI-related complications.

TABLE OF CONTENTS/OUTLINE

Part I: Mechanism, indications and impact of perioperative imaging on surgical management Review surgical technique and anatomic considerations important to HAI pump placement, specifically variant arterial anatomy Perioperative imaging for anatomy and perfusion, including normal catheter appearance on computed tomography and expected patterns of perfusion on hepatic perfusion scintigraphy Part II: Spectrum of HAI complications Hepatic arterial/catheter tip complications Distal arterial/biliary complications Pump pocket complications

GI143-ED-X

Colorectal Liver Metastases: Radio-Pathological Correlation

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Identified for RadioGraphics

Participants
Luisa Paulatto, Clichy, France (*Presenter*) Nothing to Disclose
Riccardo Sartoris, MD, Genoa, Italy (*Abstract Co-Author*) Nothing to Disclose
Marco Dioguardi Burgio, MD, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Francois Cauchy, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Sylvain Terraz, MD, Geneva, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Laura Rubbia-Brandt, Geneve, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Valerie Paradis, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Valerie Vilgrain, MD, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Maxime Ronot, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

luisa.paulatto@aphp.fr

TEACHING POINTS

1. To review the anatomo-pathological characteristics of colorectal liver metastases 2. To explain morphological changes and tumor response criteria after chemotherapy 3. To discuss how to correlate these modifications to the existing radiological response criteria (Chun, RECIST, iRECIST)

TABLE OF CONTENTS/OUTLINE

Histotypes of colorectal liver metastasis - Colloid liver metastases and their differentials Histologic tumor response assessment after preoperative chemotherapy - Tumor regression grade (TRG) - Other histologic findings: necrosis, cystic changes, calcifications - The peculiarity of colloid metastasis Correlation between histologic changes and CT/MRI morphologic appearance Patterns of tumor progression after neoadjuvant chemotherapy before hepatic resection - Dangerous halo - Peripheral regrowth Radiological criteria of tumor response after neoadjuvant chemotherapy (Chun, RECIST, iRECIST) Correlation between radiological criteria and survival

GI144-ED-X

CT Imaging of Retrievable IVC Filters: What the General Radiologist Should Know When Temporary Becomes Permanent

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Bosten Miller, MD, Riverview, FL (*Presenter*) Nothing to Disclose
Rajendra P. Kedar, MD, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Recognize the common types of retrievable and permanent IVC filters. Understand the anatomy of the IVC and appropriate positioning of IVC filters. Illustrate the short term and long term complications associated with indwelling IVC filters and how to correctly report these findings. Understand the recent controversy and FDA warnings associated with IVC filters and when they should be considered for removal. Understand the general radiologist's role in preventing future IVC filter complications.

TABLE OF CONTENTS/OUTLINE

Types of commonly used IVC filters. Permanent Retrievable Convertible/future models IVC filter complications Penetration Invasion of adjacent organs and structures Fracture Limb embolization Migration Tilting IVC occlusion/worsening lower extremity DVT Recent news and controversy FDA warnings 2010 and 2014 Increasing litigation When to consider removal Risk/benefit determination Suggestions to improve reporting

Printed on: 10/29/20

GI145-ED-X

DUOPA in Distress: What Radiologists Should Know About a New Gastrojejunostomy System Fraught with Complications

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Molly Downey, MD, Portland, OR (*Presenter*) Nothing to Disclose
Evan R. Narasimhan, MD, Portland, OR (*Abstract Co-Author*) Nothing to Disclose
Kyle K. Jensen, MD, Portland, OR (*Abstract Co-Author*) Nothing to Disclose
Bryan R. Foster, MD, Portland, OR (*Abstract Co-Author*) Consultant , BotImage Inc

For information about this presentation, contact:

downey@ohsu.edu

TEACHING POINTS

The AbbVie percutaneous gastrojejunostomy tube is a unique, emerging device for continuous delivery of Parkinson's medication (DUOPA) with which the radiologist should be familiar. These tubes have a high rate of complications after placement and require frequent imaging assessment and interrogation by radiologists. The tubing may be hard to identify on abdomen radiographs and radiologists require knowledge of the hub construction system for contrast injection, as well as the appearance of tube misplacements, in order to diagnose complications.

TABLE OF CONTENTS/OUTLINE

Brief overview of Parkinson's disease and therapy - current therapy regimens and where new DUOPA therapy fits. DUOPA therapy - medication delivery and brief discussion of efficacy. PEG-J tubing delivery system - PEG-J placement procedure overview, tube construction and how to access for contrast injection. Normal appearance on radiograph and fluoroscopy. Tubing system complications - Overview of published complication rates, complication data from our institution and case-based pictorial review of various complications.

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI146-ED-X

The Biliary Cystadenoma: Evolving and Updated

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Ryan Wolfe, DO, Burlington, MA (*Presenter*) Nothing to Disclose
Francis J. Scholz, MD, Burlington, MA (*Abstract Co-Author*) Owner, F Spoon Company; Spouse, Owner, F Spoon Company
Yevgeniy S. Arshanskiy, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Jeremy R. Wortman, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ryan.wolfe@lahey.org

TEACHING POINTS

The histology of biliary cystadenoma (BCA) is evolving with classifications into BCAs with and without ovarian stroma. Complete intact excision of BCAs by lobectomy or enucleation is necessary to prevent recurrence of both benign and malignant forms. Marsupialization or drainage results in recurrence. Malignancy can occur *de novo* or from malignant transformation of a BCA.

TABLE OF CONTENTS/OUTLINE

The educational exhibit will be presented as follows: background/pathophysiology, discussion about the evolving classifications of BCAs, the epidemiology with discussion of the overwhelming female predominance, imaging features with associated examples from different modalities (computed tomography, magnetic resonance imaging, magnetic resonance cholangiopancreatography, and ultrasound), imaging and gross specimen correlation, differential diagnosis (such as epithelioid hemangioendotheliomas, hydatid cysts, liver abscesses, cystic or necrotic neoplasm, atypical simple cyst, biliary intraductal papillary mucinous neoplasm, post traumatic cyst, hemorrhagic cyst, and embryonal sarcoma), management, and conclusion.

Printed on: 10/29/20

GI147-ED-X

Multifaceted Pancreatic Serous Cystadenoma and Its Differential Diagnosis at MRI

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Pardeep K. Mittal, MD, Augusta, GA (*Presenter*) Nothing to Disclose
Nikhar Kinger, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Camila L. Vendrami, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Brett Hausauer, MD, Augusta, GA (*Abstract Co-Author*) Nothing to Disclose
Thomas L. Estes JR, MD, Augusta, GA (*Abstract Co-Author*) Nothing to Disclose
Courtney C. Moreno, MD, Suwanee, GA (*Abstract Co-Author*) Nothing to Disclose
Frank H. Miller, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

pardeep.mittal@gmail.com

TEACHING POINTS

-Describe imaging features of different variants of pancreatic serous cystadenoma -Discuss how to differentiate pancreatic cystic and solid lesions which mimic pancreatic serous cystadenoma -Role of endoscopic ultrasound and biopsy in differentiating benign and malignant cystic lesions

TABLE OF CONTENTS/OUTLINE

Pancreatic cystic neoplasms account for approximately 16% of primary pancreatic cystic neoplasms. In evaluating pancreatic cystic lesions, MRI is considered superior to other modalities due to its soft tissue contrast, multiplanar capabilities and delineation of intracystic architecture. Types of serous cystadenoma (SCA) are: Microcystic Macrocystic Oligocystic Solid Serous cyst adenoma with hemorrhage VHL disease Mimics of SCA: Pseudocyst MCN SPEN IPMN Lymphoeithelial cyst Cystic NET Pancreatic adenocarcinoma Metastasis Not all cases of SCA demonstrate typical features and remain indeterminate due to the multifaceted nature of the neoplasm. For these reasons EUS with FNA is sometimes required for confirmation despite MRI's excellent information.

GI148-ED-X

Automated CT Biomarkers for Opportunistic Cardiometabolic Screening: Adding Value Beyond the Clinical Indication

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Identified for RadioGraphics

Participants
Perry J. Pickhardt, MD, Madison, WI (*Presenter*) Stockholder, SHINE Medical Technologies, Inc; Stockholder, Elucent Medical; Advisor, Bracco Group;
Peter Graffy, Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Meghan G. Lubner, MD, Madison, WI (*Abstract Co-Author*) Grant, Koninklijke Philips NV; Grant, Johnson & Johnson;
Ronald M. Summers, MD,PhD, Bethesda, MD (*Abstract Co-Author*) Royalties, iCAD, Inc; Royalties, Koninklijke Philips NV; Royalties, ScanMed, LLC; Royalties, Ping An Insurance Company of China, Ltd; Research support, Ping An Insurance Company of China, Ltd; Research support, NVIDIA Corporation; ; ; ;

TEACHING POINTS

1. Explain the rationale for opportunistic screening at abdominal CT, utilizing data that typically goes unused in clinical practice. 2. Describe CT-based biomarkers that can be obtained in a manual, semi-automated, or fully-automated fashion. 3. Provide an overview of encouraging initial results based on opportunistic CT data for predicting future 'cardiometabolic' events. 4. Lay out a potential framework for ultimately incorporating fully-automated CT-based biomarkers for cardiometabolic risk stratification.

TABLE OF CONTENTS/OUTLINE

1. Overview of opportunistic screening at abdominal CT 2. Cardiometabolic screening opportunities at abdominal CT: Bone mineral density (BMD) for osteoporosis Abdominal aortic calcium scoring Visceral (and subcutaneous) fat quantification ' Muscle bulk and density for sarcopenia Liver attenuation for steatosis 3. Applying artificial intelligence machine-learning algorithms for full automation: Technical success rates and challenges Comparison of manual vs. automated measures Initial results for predicting future cardiovascular events, fragility fractures, and death 4. The (near) future: Providing automated data prospectively in routine practice Structured reporting of predictive biomarker data for referring clinicians

GI149-ED-X

Imaging of Pathology Involving the Hepatic Veins and Inferior Vena Cava

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Jojo J. Yeboa, MD, Worcester, MA (*Presenter*) Nothing to Disclose
Madison McKenney, MD, Worcester, MA (*Abstract Co-Author*) Nothing to Disclose
Alan J. Goldstein, MD, Worcester, MA (*Abstract Co-Author*) Nothing to Disclose
Aaron L. Harman, MD, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Young H. Kim, MD, Worcester, MA (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Pictorial review of normal anatomy, anatomic variants, and pathologic processes involving the hepatic veins and inferior vena cava (IVC). Demonstrate the utility of various imaging modalities (ultrasound, CT, MR, and angiography) in the diagnosis of hepatic vein and IVC pathology. Illustrate secondary tumoral extension/invasion of the hepatic veins/IVC (e.g. hepatocellular carcinoma, renal cell carcinoma, and adrenal cortical carcinoma). Illustrate primary tumors of the hepatic veins/IVC (e.g. leiomyosarcoma). Demonstrate classic Budd-Chiari syndrome (BCS) and hepatic vena cava-BCS (HVC-BCS). Review of imaging pitfalls such as pseudolipoma, and pseudothrombosis.

TABLE OF CONTENTS/OUTLINE

Review of normal anatomy and anatomic variants disrupting normal venous outflow from the liver. Discuss primary tumors of the veins which result in impediment of hepatic venous outflow. Provide examples of primary tumors of the adjacent organs (liver, kidneys and adrenal glands) that can become locally invasive and disrupt hepatic venous outflow. Demonstrate examples of hepatic venous outflow obstruction due to thrombosis in Budd-Chiari syndrome (BCS) and hepatic vena cava-BCS (HVC-BCS). Provide imaging examples of processes that mimic obstruction of the hepatic venous outflow.

GI150-ED-X

The Ghost in MRCP: How to Reduction Motion Artifact in Respiratory-Gated MRI

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Shogo Nishi, Koshi-shi, Japan (*Presenter*) Nothing to Disclose
Hirotoshi Maruyama, RT, Koshi, Japan (*Abstract Co-Author*) Nothing to Disclose
Tukasa Sakemoto, Oomura , Japan (*Abstract Co-Author*) Nothing to Disclose
Nobuyuki Tabata, RT, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Akira Takahashi, Koshi-shi , Japan (*Abstract Co-Author*) Nothing to Disclose
Keita Okahara, RT, Omura Nagasaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Tetsuro Arisako, Kumamoto-City , Japan (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

The visibility of the magnetic resonance cholangiopancreatography (MRCP) image using the respiratory-gated was performed by changing the position of the respiratory sensor, and its usefulness was evaluated. Our evaluation method is comparison the stability of respiratory waveform, and evaluation of the visibility of the MRCP image. By optimizing the position of the respiratory sensor, and provides MRCP imaging that lead to an accurate diagnosis of pancreaticobiliary disease.

TABLE OF CONTENTS/OUTLINE

In the diagnosis of pancreaticobiliary disease, it is important to obtain an accurate MRCP image. Respiratory-gated is an imaging techniques that reduce motion artifacts in MRCP. However, respiratory-gated MRCP, occurs instability of the respiratory waveform by the patient. Motion artifacts occur, and the reduced visibility is a problem. We found that body mass index (BMI) and respiratory waveform stability were related. The stability of the respiratory waveform was reduced at BMI < 18.5 kg / m2. Respiratory sensor positioned vertically on the side of the abdomen stabilizes the respiratory waveform without being influence by BMI and improves the visibility of the MRCP image. We found that the method of positioned the respiratory sensor vertically on the side of the abdomen provides the most clinically useful image.

GI151-ED-X

Something's Wrong with My Six-Pack: Pre and Post-Surgical Imaging Findings of Abdominal Wall Hernias

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Felipe Aluja, MD, Bogota, Colombia (*Presenter*) Nothing to Disclose
Sebastian Cifuentes Sandoval, MD, Bogota, Colombia (*Abstract Co-Author*) Nothing to Disclose
Fernando R. Gutierrez, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Sanjeev Bhalla, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

faluja@javeriana.edu.co

TEACHING POINTS

1. Identify the normal anatomy of the abdominal wall with emphasis on computed tomography 2.To recognize the CT protocol for evaluation the abdominal wall 3. Describe the classification of the abdominal wall hernias and illustrate the classification of abdominal wall hernias with special emphasis on computed tomography 4. Review the key elements to discuss in the radiological report in the presurgical and postsurgical evaluation of abdominal wall hernias

TABLE OF CONTENTS/OUTLINE

1. Introduction 2. Imaging anatomy of the abdominal wall 3. Presurgical evaluation of abdominal wall hernias 3.1 Classifying abdominal wall hernias based on European Hernia Society (EHS) classification 3.2 The radiologist perspective and the surgical perspective: unifying concepts 4. Postsurgical assessment of abdominal wall hernias on CT scans 4.1 Complications of surgical repair of abdominal wall hernias 5. Conclusions

GI152-ED-X

MR Imaging of Acute Abdomen: Acute Appendicitis and Beyond

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Jeffrey Guccione, Houston, TX (*Presenter*) Nothing to Disclose
Katherine J. Blair, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Kaustubh Shiralkar, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Steven S. Chua, MD, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Chakradhar R. Thupili, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Venkateswar R. Surabhi, MD, Sugar Land, TX (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

1. Value of various imaging modalities in the evaluation of acute abdomen with emphasis on MRI. Preoperative diagnosis of acute appendicitis is heavily dependent on imaging findings and MR of the abdomen is increasingly performed particularly in children and pregnant women due to lack of ionizing radiation and increasing availability. 2. Review MRI protocol for evaluation of acute abdomen. 3. Imaging criteria and spectrum of appendicitis including identification of perforation on MRI. 4. MR imaging examples of many other causes that can mimic acute appendicitis clinically.

TABLE OF CONTENTS/OUTLINE

1. MRI examples of acute appendicitis including clues to diagnosis of perforation on MRI. 2. Several MRI examples of alternative diagnostic possibilities in pediatric patients such as terminal ileitis, colitis, ovarian torsion, ureteric calculus, acute pyelonephritis, myositis, osteomyelitis, omental torsion, omental infarction, epiploic appendagitis, testicular torsion, strangulated hernia, intussucpetion, ruptured corpus luteal cyst, and tubo-ovarian abscess. 3. Several MRI examples of alternative diagnostic possibilities in pregnant patients such as ectopic pregnancy, degenerating fibroid, interstitial pregnancy, open cervical os with progressing abortion, subchorionic hemorrhage, and placental abruption.

GI153-ED-X

Biologic Therapy in Inflammatory Bowel Disease: A Radiologic Review

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Daniel R. Ludwig, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Malak Itani, MD, Clayton, MO (*Abstract Co-Author*) Nothing to Disclose
Tyler J. Fraum, MD, Saint Louis, MO (*Abstract Co-Author*) Consultant, Arterys Inc; Research support, Siemens AG
Maria Zulfiqar, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Kumaresan Sandrasegaran, MD, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose
Venkata S. Katabathina, MD, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Vincent M. Mellnick, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ludwigd@wustl.edu

TEACHING POINTS

• Biologic therapies used to treat inflammatory bowel disease (IBD) include tumor necrosis factor (TNF)-a, a4 integrin, and interleukin 12/23 inhibitors. • Manifestations of IBD include active inflammatory disease, chronic fibrostenosing disease, and penetrating disease. • Magnetic resonance enterography (MRE) is routinely used to stage disease activity and monitor treatment response to biologic therapies. • Patients receiving biologic therapies are immunosuppressed, and are therefore at risk for opportunistic viral, fungal, and granulomatous infectious, as well as hematologic malignancy.

TABLE OF CONTENTS/OUTLINE

• Discuss the available biologic therapies used in inflammatory bowel disease (IBD), including their indications and contraindications. • Demonstrate the findings of active inflammatory, chronic fibrostenosing, and penetrating IBD on MRE. • Review the role of MRE in monitoring response to biologic therapy. • Illustrate the spectrum of infectious and malignant complications of biologic therapy in the setting of IBD.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI154-ED-X

Prediction and Early Recognition of Biliary Procedure Complications: Identifying What Really Matters

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Andre L. Bordini, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Marcelo d. Gusmao, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Liege T. Gomes, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Felipe R. Ferreira, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Cinthia D. Ortega, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Speaker, Johnson & Johnson
Regis Otaviano Bezerra, MD, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Tomazo Franzini, Sao Paulo, Brazil (*Abstract Co-Author*) Consultant, Boston Scientific Corporation
Thiago Visconti, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Manoel S. Rocha, MD, PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

bordini.andre@gmail.com

TEACHING POINTS

Anatomy overview (peritoneal spaces and biliary tract). Overview of principal complications of biliary invasive procedures, including the recent advances in biliary instrumentation. How can imaging help us? Illustrate the main complications of endoscopic retrograde cholangiopancreatography (ERCP) / peroral cholangiopancreatoscopy (POC) and percutaneous transhepatic biliary drainage (PTBD). Understand how to recognize predisposing factors for procedures complications.

TABLE OF CONTENTS/OUTLINE

Brief anatomy discussion regarding peritoneal spaces and biliary tract. Imaging examples of complications from invasive biliary procedures (ERCP / POC and PTBD): Acute pancreatitis Cholangitis Intestinal perforation Subcapsular hematoma Prosthetic migration Biliary fistula How to identify anatomic features that may be predisposing factors to complications: Hepatopathy Ascites Focal liver lesions Coledocal and papilary venous collaterals

Printed on: 10/29/20

GI155-ED-X

How to Interpret Magnetic Resonance Imaging for Acute Gastrointestinal Lesions: Correlation with Pathophysiology

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Akitoshi Inoue, MD,PhD, Higashioumi, Japan (*Presenter*) Nothing to Disclose
Shinichi Ota, MD,PhD, Otsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Kai Takaki, MD, Otsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Norihisa Nitta, MD, Kyoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Yugo Imai, MBBS, Otsu City, Japan (*Abstract Co-Author*) Nothing to Disclose
Tatsuya Oki, MD, Otsu City, Japan (*Abstract Co-Author*) Nothing to Disclose
Akira Furukawa, MD, PhD, Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

akino@belle.shiga-med.ac.jp

TEACHING POINTS

MRI is widely used for acute gastrointestinal lesions such as appendicitis for pregnant females and children because of no radiation exposure. To show appropriate protocol of MR examination To know role of respective sequences To review MRI findings of acute gastrointestinal lesions in contrast to pathophysiology

TABLE OF CONTENTS/OUTLINE

MRI sequences and their roles T1WI: Detection of hemorrhage and T1 bright appendix T2WI: Assessment of intensity of bowel wall FS-T2WI: Assessment of fat stranding True-FISP: Evaluation of intravascular structure DWI: Detection of abscess Cine MRI: Differentiation between obstruction and adynamic ileus MRI findings and pathophysiology with case presentations Wall thickening Target appearance: Inflammation such as appendicitis, diverticulitis, etc, repurfusion due to non-occlusive mesenteric ischemia T2 dark thickening: fibrous change: ischemic enteritis, Crohn disease (chronic phase) Loss of luminal structure: Neoplastic lesions Wall defect Mucosal defect: necrotizing ischemic colitis Penetration: gastric ulcer Perforation: duodenal ulcer Dilatation Obstruction: adhesion, internal hernia, intussusception, volvulus Adynamic ileus: peritonitis Others

GI156-ED-X

Imaging Spectrum of Ischemic Colitis: A Case-based Review

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Sang Soo Shin, MD, Gwangju, Korea, Republic Of (*Presenter*) Nothing to Disclose
Chung Man Moon, Gwangju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Suk Hee Heo, MD, Jeollanam-Do , Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yong-Yeon Jeong, MD, Gwangju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

kjradsss@gmail.com

TEACHING POINTS

1. To describe various imaging findings of ischemic colitis, which are correlated with underlying pathophysiology. 2. To suggest useful findings toward ischemic colitis in differential diagnoses of various colonic diseases. 3. To introduce a novel diagnostic method in diagnosing ischemic bowel disease

TABLE OF CONTENTS/OUTLINE

A. Overview of ischemic colitis B. Classification of ischemic colitis with its representative cases 1. Non-gangrenous 1) Early stage 2) Reperfusion 3) Chronic stage 2. Gangrenous C. Useful imaging findings suggestive of ischemic colitis D. Differential diagnosis with other bowel disease 1. Pseudomembranous colitis 2. Tuberculous colitis 3. Infectious colitis 4. Inflammatory bowel disease 5. Colon carcinoma E. Introduction of a novel diagnostic method in diagnosing ischemic bowel disease F. Conclusion

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI157-ED-X

Small and Large Bowel Obstruction: Imaging approach, Etiology, and Treatment

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Jaime Martinez, MD, Bogota D.C., Colombia (*Presenter*) Nothing to Disclose
Arnold Barrios, MD, Bogota, Colombia (*Abstract Co-Author*) Nothing to Disclose
Fanny A. Zambrano, Bogota , Colombia (*Abstract Co-Author*) Nothing to Disclose
Jorge E. Fuentes, MD, Bogota, Colombia (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

mito005004@gmail.com

TEACHING POINTS

Review the definition, etiology and the diagnostic approach of Small Bowel Obstruction (SBO) and Large Bowel Obstruction (LBO) with emphasis on what the surgeon wants to know.Discuss the use of water-soluble contrast media and conservative and surgical management with emphasis on what the radiologist should know.

TABLE OF CONTENTS/OUTLINE

Printed on: 10/29/20

GI158-ED-X

Microbiota-Induced Gastrointestinal Malignancies: A Comprehensive Review

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit
Identified for RadioGraphics

Participants
Sean Daly, San Antonio, TX (*Presenter*) Nothing to Disclose
Julia Kirsten, BS, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Apurva A. Bonde, MBBS, MD, Beaverton, OR (*Abstract Co-Author*) Nothing to Disclose
Sainath Kondapaneni, San Antonio,, TX (*Abstract Co-Author*) Nothing to Disclose
Vincent M. Mellnick, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Venkata S. Katabathina, MD, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

katabathina@uthscsa.edu

TEACHING POINTS

Discuss the spectrum of gut microbiome-induced GI malignancies & associated pathogens Elucidate possible oncogenic mechanisms of bacterial & virus-induced GI cancers Describe imaging findings & role of imaging in the management of infection-induced GI cancers

TABLE OF CONTENTS/OUTLINE

Introduction to the gut microbiome Bacteria & Virus in GI cancers Pathogenesis: oncogenic proteins, chronic inflammation, oxidative stress & blockage of immune-effectors Esophageal adenocarcinoma (Helicobacter pylori) Gastric adenocarcinoma (H. pylori & Epstein Barr virus) MALT lymphoma (H. pylori) Colorectal cancer (Streptococcus bovis, Escherichia coli, Helicobacter pylori, & Mycoplasma sp.) Anal carcinoma: HPV virus Cross-sectional Imaging Features Role of Imaging in diagnosis & follow-up Healthy GI Microbiome: Probiotics in GI cancer treatment & prevention Future Directions Conclusion Summary: Select GI tract cancers are caused by resident microbiome by inducing chronic inflammation. Healthy microbiota in the GI tract is a key factor in preventing these cancers & probiotics are being used in cancer prevention & treatment. Imaging plays a pivotal role in diagnosis & management.

GI159-ED-X

Perineum, the Great Forgotten: Test Your Knowledge in Unusual Perineal Masses

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Itziar Aza, MD, Bilbao , Spain (*Presenter*) Nothing to Disclose
Udane Oiartzabal, MD , Bilbao, Spain (*Abstract Co-Author*) Nothing to Disclose
Ane Miren Ibanez, MD, Bilbao, Spain (*Abstract Co-Author*) Nothing to Disclose
Maria Isusi, Bilbao, Spain (*Abstract Co-Author*) Nothing to Disclose
Naroa Nates Uribe, Bilbao, Spain (*Abstract Co-Author*) Nothing to Disclose
Almudena Quilez Larragan, DO, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Eider Alcalde Odriozola, Bilbao, Spain (*Abstract Co-Author*) Nothing to Disclose
Sandra Delgado, MD, Bilbao, Spain (*Abstract Co-Author*) Nothing to Disclose
Gonzalo Lecumberri SR, PhD, Bilbao, Spain (*Abstract Co-Author*) Nothing to Disclose
Maria Victoria Barcena, Bilbao, Spain (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

The perineal space is often overlooked due to the complexity of its anatomy and the infrequency of abnormalities. The purpose of this exhibit is to review the normal anatomy of the perineum and to show a series of unsual cases.

TABLE OF CONTENTS/OUTLINE

Normal anatomy of the perineum will be explained as seen on MRI and CT. The cases of perineal masses will be presented in a quiz format. The list of cases includes: Soft-tissue masses: Cobb syndrome, myxoid liposarcoma, low grade liposarcoma. Anorrectal masses: Rectovaginal septum GIST, GIST on recto-prostatic space, anal gland adenocarcinoma, epidermoid carcinoma of the anal canal, perianal extra-mammary Paget's disease. Genitourinary masses: Vulvar sarcoma, vulvar lipoma, periurethral adenoid cystic carcinoma, secondary non-Hodgkin lymphoma of the vagina, bladder leiomyoma. Perineal masses extending from the pelvis: Solitary fibrous tumor, primary presacral neuroendocrine tumor, chordoma.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI160-ED-X

Morphometric Changes and Imaging Findings of Diffuse Liver Disease in Relation to Intrahepatic Hemodynamics

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Kumi Ozaki, Fukui, Japan (*Presenter*) Nothing to Disclose
Kazuto Kozaka, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Hirohiko Kimura, MD, PhD, Sabae, Japan (*Abstract Co-Author*) Nothing to Disclose
Toshifumi Gabata, MD, PhD, Kanazawa, Japan (*Abstract Co-Author*) Nothing to Disclose
Osamu Matsui, MD, Kanazawa, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ozakik-rad@umin.org

TEACHING POINTS

1. To review the various factors related with morphometric changes of diffuse liver disease. 2. To review the imaging findings of diffuse liver disease. 3. To review the difference of diffuse liver disease between each etiology based on the histopathological background. 4. To focus the noncirrhotic disease mimicking cirrhosis in terms of radiographic features. 5. To summarize useful tips to differentiate each etiology of diffuse liver disease.

TABLE OF CONTENTS/OUTLINE

1. Introduction 2. Review the various factors related with morphometric changes of diffuse liver disease focusing on micro and macro hemodynamics 3. Present the common radiographic features of cirrhotic change 4. Difference of radiographic features between each etiology of diffuse liver disease 5. Present the noncirrhotic disease mimicking cirrhosis in terms of radiographic features. 6. Conclusion

GI161-ED-X

Pearls and Pitfalls of Imaging Features of Pancreatic Cystic Lesions: A Case-Based Approach

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Kumi Ozaki, Fukui, Japan (*Presenter*) Nothing to Disclose
Kazuya Maeda, Fukui, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasuharu Kaizaki, Fukui, Japan (*Abstract Co-Author*) Nothing to Disclose
Hirohiko Kimura, MD, PhD, Sabae, Japan (*Abstract Co-Author*) Nothing to Disclose
Toshifumi Gabata, MD, PhD, Kanazawa, Japan (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Imaging features of pancreatic cystic lesions have been well-known, and have been fully summarized in a number of presentations using recent advanced imaging modality; however we occasionally encounter the challenging cases in preoperative diagnosis. The purposes of this exhibit are to present imaging features of various pancreatic cystic lesions focusing on the diagnostic challenge in preoperative imaging diagnosis and to reconfirm the key point of differential diagnostic of pancreatic cystic lesion.

TABLE OF CONTENTS/OUTLINE

1. Introduction 2. List of the pancreatic cystic lesions including tumor and non-neoplastic lesions and their management 3. Illustrate the representative pancreatic cystic lesions 4. Case-based imaging review of CT and MR imaging findings in various pancreatic cystic lesions with histopathological correlation 5. Cystic tumors such as serous and mucinous cystic neoplasm, intraductal papillary mucinous neoplasm, lymphepithelial cyst, and epidermoid cyst 6. Cystic degeneration of solid neoplasms such as neuroendocrine tumor, solid-pseudopapillary neoplasm, and adenocarcinoma 7. Mimicking cystic lesion such as mucinous carcinoma 8. Non-neoplastic lesions 9. Parapancreatic lesions such as metastatic lymph node with cystic degeneration, degenerated neurogenic tumor 10. Discuss the differential diagnosis of these lesions 11. Conclusion

Printed on: 10/29/20

GI162-ED-X

The Closed-Loop Conundrum: Imaging Features of Closed-Loop Small Bowel Obstruction on CT

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Raymond Ramzi, MD, Brooklyn, NY (*Presenter*) Nothing to Disclose
Alexandra Napolitano, MD, Brooklyn, NY (*Abstract Co-Author*) Nothing to Disclose
Anju Dubey, MD, Brooklyn, NY (*Abstract Co-Author*) Nothing to Disclose
Erli Mingomataj, MD, Brooklyn, NY (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Closed-Loop Small bowel obstruction (CLSBO) is caused by obstruction at two points, most commonly due to adhesions and internal hernia. CLSBO has a high rate of morbidity and mortality due to strangulation. Classic findings of CLSBO include: identification of 2 or more transition points, A C-shaped dilated loop of bowel, the 'beak' or 'whirl' sign, and presence of two collapsed bowel loops adjacent to a dilated loop. Appearance of CLSBO can vary, depending on the length and orientation of involved bowel.

TABLE OF CONTENTS/OUTLINE

Causes and Pathophysiology of CLSBO : usually adhesions or internal hernias leading to volvulus. Importance of recognizing CLSBO Review of classic findings of CLSBO including C-shaped loop of bowel, 'beak or 'whirl' sign, with example cases. Review of more complicated cases; show importance of following the length of bowel for transition points and of viewing in different planes. Review of some pitfalls with example cases. Summary/Conclusion

GI163-ED-X

Imaging Manifestations of Meckel's Diverticulum: We Love Meckel's Diverticulum!

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Rika Yoshida, MD, Izumo, Japan (*Presenter*) Nothing to Disclose
Takeshi Yoshizako, MD, Izumo, Japan (*Abstract Co-Author*) Nothing to Disclose
Hajime Kitagaki, MD, Izumo, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yoshidar@med.shimane-u.ac.jp

TEACHING POINTS

Teaching points Meckel's diverticulum is a small pouch in the wall of the small intestine. Most people who have a Meckel's diverticulum never have any symptoms. About half the people who do have symptoms are children. Sometimes, it causes an acute abdomen in adults. We describe the diagnosis of Meckel's diverticulum by focusing on the acute abdomen. If we become radiologists, we want to diagnose Meckel's diverticulum, right? How? 1. Recognize typical findings of Meckel's diverticulum 2. Check the intestinal loop 3. Identify the yolk sac artery

TABLE OF CONTENTS/OUTLINE

We discuss the following complications of Meckel's diverticulum: 1. Meckel's diverticulitis: On a CT scan, Meckel's diverticulitis shows a blind-ending, tubular, round or oval structure in the lower right quadrant or periumbilical region with surrounding inflammation. It is important to identify a normal appendix. 2. Meckel's torsion 3. Hemorrhage 4. Small bowel obstruction: Meckel's diverticulum may produce an obstruction or internal hernia through the formation of a band (mesodiverticular band). 5. Inverted Meckel's diverticulum: Meckel's diverticulum may invert into the lumen of the small intestine. The diverticulum may serve as the site for an intestinal obstruction or the lead point for an intussusception.

GI164-ED-X

Preoperative Simulation in Malignant Liver Tumor Resection: Is Simulation Possible without Liver Analysis Application Software?

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Kouhei Harada, RT,PhD, Sapporo, Japan (*Presenter*) Nothing to Disclose
Yoshiya Oohashi, Sapporo, Japan (*Abstract Co-Author*) Nothing to Disclose
Ayaka Chiba, Sapporo, Japan (*Abstract Co-Author*) Nothing to Disclose
Kanako Numazawa, RT, Sapporo, Japan (*Abstract Co-Author*) Nothing to Disclose
Tatsuya Imai, Sapporo, Japan (*Abstract Co-Author*) Nothing to Disclose
Shun Hayasaka, Sapporo, Japan (*Abstract Co-Author*) Nothing to Disclose
Toru Mizuguchi, Sapporo, Japan (*Abstract Co-Author*) Nothing to Disclose
Minoru Nagayama, Sapporo, Japan (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

1. Imaging and image reconstruction methods required for preoperative simulation 2. Imaging of blood vessels, tumors, and liver parenchyma necessary for preoperative simulation 3. Liver volumetry 4. Simulation images in various hepatectomy types

TABLE OF CONTENTS/OUTLINE

1. Importance of preoperative special computed tomographic imaging 2. Essential preoperative anatomical imaging 3. Method of creating vessels, tumors, and liver parenchyma 4. Accurate liver volumetry 5. Simulation before hepatectomy (a) Massive hepatectomy (trisectorectomy/bisectorectomy) (b) Left-sided/right-sided hepatectomy (c) Segmentectomy (d) Limited resection/enucleation SUMMARY: In recent years, endoscopic surgery has become more commonly indicated for resection of liver malignancies. Therefore, there is an increasing requirement of preoperative simulation images for safe and secure surgery. Computed tomographic and workstation technologies can be combined to create high-quality preoperative images. We explain the preoperative imaging and simulation of various hepatectomy types in detail.

GI165-ED-X

Colorectal Cancer in the Emergency Department: Don't Miss It!

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Patricia M. Costa, MD , Matosinhos, Portugal (*Presenter*) Nothing to Disclose
Ana C. Silva, MD, Porto, Portugal (*Abstract Co-Author*) Nothing to Disclose
Catarina A. Silva, MD, Guimaraes, Portugal (*Abstract Co-Author*) Nothing to Disclose
Maria J. Ribeiro, Porto, Portugal (*Abstract Co-Author*) Nothing to Disclose
Ligia Freire, Porto, Portugal (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

patriciamdc24@gmail.com

TEACHING POINTS

Review the clinical settings in the emergency department that should raise the suspicion of an acute presentation of colorectal cancer (CRC). Provide tips and tricks to the identification of unexpected CRC in routine Computed Tomography (CT). Present anatomo-radiological correlation of CRC identified in the emergency setting.

TABLE OF CONTENTS/OUTLINE

- Background - Clinical settings of acute presentation of CRC - Radiological findings of acute presentation of CRC - CRC in routine CT - CRC complications Obstruction Intussusception Acute appendicitis Perforation Fistula Lower gastrointestinal bleeding Ischemic colitis Metastatic disease - Conclusions

GI166-ED-X

Gallbladder Cancer and Its Differential Diagnosis at MRI: What Radiologists Should Know

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Identified for RadioGraphics

Participants
Pardeep K. Mittal, MD, Augusta, GA (*Presenter*) Nothing to Disclose
Brett Hausauer, MD, Augusta, GA (*Abstract Co-Author*) Nothing to Disclose
Camila L. Vendrami, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Nikhar Kinger, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Thomas L. Estes JR, MD, Augusta, GA (*Abstract Co-Author*) Nothing to Disclose
Courtney C. Moreno, MD, Suwanee, GA (*Abstract Co-Author*) Nothing to Disclose
Frank H. Miller, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

pardeep.mittal@gmail.com

TEACHING POINTS

1. To demonstrate MRI findings of gallbladder cancer and its mimics 2. To define classification and staging of gallbladder cancer 3. To highlight important findings for diagnosis and management

TABLE OF CONTENTS/OUTLINE

Gallbladder cancer is a rare but deadly malignancy that is often difficult to diagnose early. MRI, an excellent modality for evaluation of soft tissues, plays an important role in identifying gallbladder pathology and management. We demonstrate examples of gallbladder cancer and also discuss primary gallbladder cancer staging according to the AJCC TNM system. Will discuss mimics of gallbladder cancer including Metastatic disease Lymphoma Xanthogranulomatous cholecystitis Tumefactive sludge Tubular adenoma Adenomyoma Hyalinizing cholecystitis Importance of post operative follow up will also be discussed We highlight findings important for diagnosis and surgical management.

GI167-ED-X

'There's Something in my Throat': Educational Review of Common and Not-So-Common Etiologies of Dysphagia

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Michael C. Prasad Jr, MD, South Orange, NJ (*Presenter*) Nothing to Disclose
Joshua I. Katz, DO, Morristown, NJ (*Abstract Co-Author*) Nothing to Disclose
Jessica Schneidman, MS, Wayne, NJ (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Michael.prasad@atlantichealth.org

TEACHING POINTS

TEACHING POINTS 1. Describe the various causes of dysphagia as assessed through fluoroscopic guidance. 2. Review the imaging characteristics of various causes of dysphagia pathology primarily through fluoroscopic imaging with further workup imaging, including plain film and CT. 3. Discuss the epidemiology, clinical presentation, appropriate workup, and treatment of the causes of dysphagia

TABLE OF CONTENTS/OUTLINE

TABLE OF CONTENTS/OUTLINE Request for dysphagia evaluation through fluoroscopic imaging is a common place in radiology. The ability of the radiologist to recognize the entity on a fluoroscopic modality can have significant impact on future management outlook. The differential diagnosis of dysphagia is broad yet can be narrowed based on structural and neuromuscular causes of dysphagia. We will perform a case-based review of the imaging characteristic of dysphagia. After completing this educational exhibit, the reader will be able to recognize the various causes of dysphagia. Structural Causes Cricopharyngeal Bar or Prominent Cricopharyngeus Muscle Pharyngeal Diverticula Cervical Spinal Osteophytes Enlarged Thyroid Postoperative/Post-therapy Neuromuscular Causes Post-Swallow Pharyngeal Residue Laryngeal Penetration Aspiration

Printed on: 10/29/20

GI168-ED-X

Primary Sclerosing Cholangitis: Emphasis on Role of MRI in Assessing Evolution and Complications

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Anirudh V. Nair, MBBS, Ottawa, ON (*Presenter*) Nothing to Disclose
Blair MacDonald, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

dranirudhnair@gmail.com

TEACHING POINTS

Describe pathophysiology, associations, diagnostic criteria and spectrum of imaging manifestation of primary sclerosing cholangitis (PSC). Recognize imaging manifestations, evolution and complications of PSC. Identify multidisciplinary literature, and international guidelines which can facilitate decision making, and develop appropriate pathways for patients with clinical suspicion for PSC and related complications.

TABLE OF CONTENTS/OUTLINE

Background of primary sclerosing cholangitis (PSC) manifestations in liver. Differentials to be considered alongside PSC. Our Institutional imaging protocol and use of contrast enhanced MRI, Hepatobiliary contrast in imaging PSC. American Association for the study of liver disease (AASLD) alogrithm for work up of (1) PSC and (2) suspected dominant stricture/Cholangiocarcinoma (CCa). Options for tissue sampling in suspected CCa . Imaging findings: (1) Pattern of involvement in biliary tracts; (2) Hepatic parenchymal and vascular changes; (3) PSC preciptated malignancies. AASLD treatment guidelines. Conclusion and Future directions.

Printed on: 10/29/20

GI169-ED-X

Gallstones Gone Crazy: An Imaging Panorama of Gallstone Complications

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Aruna R. Patil, MD, FRCR, Bangalore, India (*Presenter*) Nothing to Disclose
Shrivalli Nandikoor, MBBS, Bangalore, India (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

dr.arunarpatil@gmail.com

TEACHING POINTS

Gall stones can become symptomatic in many ways.The aim of this exhibit is : 1. To review the multimodality imaging appearances of various complications of cholelithiasis. 2. To discuss the pitfalls in interpretation and highlight the pertinent practical points learned from those cases.

TABLE OF CONTENTS/OUTLINE

The contents of the exhibit will be: An overview on the types of gallstones and associations Illustrate the complications of gall stones such as: Calculous cholecystitis and its complications (perforation, gangrenous, emphysematous, xanthogranulomatous, chronic cholecystitis,) Mucocele of gall bladder Choledocholithiasis Pancreatitis Gall stone ileus Bouveret's syndrome Mirizzi's syndrome Dropped gall stones Gall bladder carcinoma To to aware of the potential mimics of gall stone disease - gall bladder polyp, septae, adenomyosis (cholesterolosis), vascular impression, pneumobilia, parasitic calcifications, clots in hemobilia.

GI170-ED-X

Floor is Not Always Smooth: Spectrum of Pelvic Floor Abnormalities in Dynamic MRI Defecography

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Amit K. Sahu, MBBS, MD, New Delhi, India (*Presenter*) Nothing to Disclose
Bharat Aggarwal, MBBS, MD, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Himanshu Gupta, MBBS, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

drsahuamit@gmail.com

TEACHING POINTS

Pelvic floor dysfunction involving pelvic viscera are complex conditions seen frequently in adult women but also common in males. Increased use of MR in functional disorders of the pelvic floor makes it important for radiologists to familiarize with normal and pathologic findings. Dynamic MR of the pelvic floor is an excellent tool for assessing functional disorders of the pelvic floor such as pelvic organ prolapse, outlet obstruction, and incontinence.

TABLE OF CONTENTS/OUTLINE

Functional disorders of the pelvic floor are common health problems. Dynamic MR at rest,squeezing,straining & defecation has a central role in the diagnosis of pelvic floor dysfunction,and it is crucial when choosing a conservative versus surgical treatment. MR has an multifactorial increasing role in assessing pelvic floor dysfunction.Dynamic MR is performed by using a steady-state sequence acquired during maximal sphincter contraction,straining,and defecation. Compartmental abnormalities include: cystocele & urethral hypermobility and descent of the prostatic apex in males (anterior);uterine or vaginal vault prolapse (middle);rectocele (posterior).MR defecography has the potential advantage of clearly distinguishing between rectal mucosal intussusception and rectal full thickness intussusceptions which is relevant in that the treatment for the two conditions is different.

GI171-ED-X

Gynecologic Causes of Abdominal Pain on CT and MR Enterography

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
David J. Bartlett, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Shannon P. Sheedy, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Nam Ju Lee, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Stephanie Hansel, MD, Rochester, MN (*Abstract Co-Author*) Research support, Medtronic plc
David Bruining, MD, Rochester, MN (*Abstract Co-Author*) Research Grant, Given Imaging Ltd Consultant, Bracco Group
Tatnai Burnett, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Joel G. Fletcher, MD, Rochester, MN (*Abstract Co-Author*) Grant, Siemens AG; Consultant, Medtronic plc; Consultant, Takeda Pharmaceutical Company Limited; Grant, Takeda Pharmaceutical Company Limited; ;
Cynthia H. McCollough, PhD, Rochester, MN (*Abstract Co-Author*) Research Grant, Siemens AG
Wendaline M. VanBuren, MD, Rochester , MN (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

bartlett.david@mayo.edu

TEACHING POINTS

Understand clinical features that may indicate gynecologic causes of abdominal pain for patients referred fo CT/MR enterography to exclude small bowel disease. Understand how to modify standard CT/MR enterography protocols to aid in the identification of common gynecologic causes of abdominal pain. Review potential gynecologic causes of abdominal pain that can be identified on CT and MR enterography.

TABLE OF CONTENTS/OUTLINE

Standard techniques of CT and MR enterogrpahy- exams will be performed to rule out small bowel disease. Modified enterogrpahy techniques for patients with potential gynecologic causes of abdominal pain. Clinical indications that abdominal pain might be of gynecologic origin- dyspareunia, cyclic abdominal pain, pelvic pain, dyschezia, bloating, abnormal uterine bleeding, infertility Case reivew of gynecologic findings that may cause abdominal pain seen on CT/MR enterography. a. Endometriosis b. Adenomyosis c. Leiomyomata (rarely leiomyomatosis) d. Pelvic inflammatory disease e. Endometritis f. Post endometrial ablation syndrome, post ablation tubal sterilization syndrome g. Ovarian masses- neoplasms, cysts, ovarian remnant syndrome h. Ovarian torsion i. Mesenteric inclusion cysts, lymphocele j. Pelvic congestion syndrome

GI172-ED-X

The Many Faces of Bowel Ischemia

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Omar N. Kallas, MD, Atlanta , GA (*Presenter*) Nothing to Disclose
Amir Reza Radmard, MD, Tehran, Iran (*Abstract Co-Author*) Nothing to Disclose
Morteza Saneitaheri, Tehran, Iran (*Abstract Co-Author*) Nothing to Disclose
Sadhna Nandwana, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Peter A. Harri, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Amir H. Davarpanahfakhr, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

kallas.omar@gmail.com

TEACHING POINTS

Bowel ischemia refers to hypo-perfusion of the gastrointestinal tract, an entity with potentially poor outcomes, requiring early detection and emergent management. Bowel ischemia has varied imaging appearances, which radiologists should be familiar with to facilitate timely provision of care, particularly in the setting of clinically equivocal or unsuspected cases. After reviewing this exhibit, the learner should: 1. Be familiar with bowel arterial supply, venous drainage, and watershed territories. 2. Understand the various causes and categories of bowel ischemia (arterial, venous and global hypo-perfusion). 3. Understand the varied potential appearances of bowel ischemia on cross-sectional imaging. 4. Be familiar with potential bowel ischemia mimics and imaging pitfalls.

TABLE OF CONTENTS/OUTLINE

1. Review bowel vascular supply and drainage. 2. Review the role of imaging in evaluating patients with suspected bowel ischemia 3. Review usual and unusual manifestations of bowel ischemia (examples include nonocclusive mesenteric venous contrast intravasation, hypoperfusion complex, and gastric ischemia). 4. Review mimics of bowel ischemia, with examples including reversible pneumatosis cystoides intestinalis, bowel inflammation, radiation enteritis, angioedema, and vasculitis.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI173-ED-X

An Imaging Exploration of Perianal Fistulas

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
John A. Vigilante, MD, San Diego, CA (*Presenter*) Nothing to Disclose
Robert M. Marks, MD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

john.vigilante@gmail.com

TEACHING POINTS

By viewing this presentation, the viewer will accomplish: 1. A succinct, high-yield review of the relevant perianal anatomy, facilitated by high-quality original artwork created by the authors 2. A review of the Parks classification of perianal fistulas, again supported by original graphics 3. Illustrations will be correlated with 3T MRI imaging from the authors' institution to promote improved recognition and deepened understanding of perianal fistulas

TABLE OF CONTENTS/OUTLINE

-Review of perianal anatomy -Graphical representation of the Parks classification -Sample cases featuring illustrations with imaging correlates

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI174-ED-X

The Preoperative and Postoperative Colon: What the Radiologist Needs to Know

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Nandan Keshav, MD, Albuquerque, NM (*Presenter*) Nothing to Disclose
Scott C. Carter, MD, Albuquerque, NM (*Abstract Co-Author*) Nothing to Disclose
William M. Thompson, MD, Albuquerque, NM (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

nkeshav@salud.unm.edu

TEACHING POINTS

After participating in this educational exhibit, the diagnostic radiologist should be aware of various indications for colon surgery, be cognizant of different surgical techniques, be familiar with multimodality imaging features of the postoperative colon, and recognize common acute and chronic postoperative complications.

TABLE OF CONTENTS/OUTLINE

A. Indications for colon surgery 1. Colon cancer 2. Complicated diverticulitis 3. Inflammatory bowel disease B. Colon surgical techniques 1. Abdominoperineal resection 2. Anterior resection 3. Hartmann procedure 4. Restorative proctocolectomy 5. Segmental resection C. Imaging techniques 1. Fluoroscopic technique 2. MDCT technique D. Postoperative complications 1. Acute a. Anastomotic leak b. Abscess c. Obstruction/ileus 2. Chronic a. Fistulation b. Recurrence of malignancy E. Pitfalls of interpretation

Printed on: 10/29/20

GI175-ED-X

Rare Peritoneal Tumors, Tumor-Like Conditions, and Mimics: Clinical and Imaging Clues to Diagnosis

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Cum Laude

Participants
Mohab Elmohr, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Khaled M. Elsayes, MD, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose
Katherine J. Blair, MD, Houston, TX (*Presenter*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Sanaz Javadi, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Akram M. Shaaban, MBBCh, Salt Lake City, UT (*Abstract Co-Author*) Contributor, Reed Elsevier; Author, Reed Elsevier
Meghan G. Lubner, MD, Madison, WI (*Abstract Co-Author*) Grant, Koninklijke Philips NV; Grant, Johnson & Johnson;
Perry J. Pickhardt, MD, Madison, WI (*Abstract Co-Author*) Stockholder, SHINE Medical Technologies, Inc; Stockholder, Elucent Medical; Advisor, Bracco Group;

For information about this presentation, contact:

kmelsayes@mdanderson.org

TEACHING POINTS

1. Describe rare primary and secondary tumors of the peritoneum and sub-peritoneal space with emphasis on their appearance on different imaging modalities.2. Discuss a variety of non-neoplastic pathological conditions that may mimic peritoneal tumors on imaging.3. Recognize clinical and imaging clues that may help to avoid potential pitfalls in the radiological diagnosis of peritoneal tumors and mimics.

TABLE OF CONTENTS/OUTLINE

1. Primary peritoneal tumors:a. Desmoplastic small round cell tumor (DSRCT)b. Papillary serous carcinoma.c. Leiomyomatosis peritonealis disseminatad. Peritoneal mesothelioma (malignant, well-differentiated papillary, and multicystic)e. Fibromatosis (desmoid tumor)f. Primary sarcomas (including GIST)2. Secondary peritoneal tumors:a. Pseudomyxoma peritoneib. Peritoneal lymphomatosisc. Peritoneal sarcomatosisd. Peritoneal carcinomatosis (rare forms)3. Tumor-like conditions and mimics:a. Gliomatosis peritoneib. Atypical infections, such as TB and Actinomycosisc. Sclerosing peritonitisd. Splenosise. Endometriosisf. Foreign body reactionsg. Sarcoidosish. Eosinophilic peritonitisi. Extramedullary hematopoiesisj. Peritoneal metaplasia

GI176-ED-X

Unequivocal Guide to LI-RADS Treatment Response: Assessment of HCC Response After Arterial-based Locoregional Therapies

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Joseph H. Yacoub, MD, Maywood, IL (*Presenter*) Nothing to Disclose
Ania Z. Kielar, MD, Shanty Bay, ON (*Abstract Co-Author*) Nothing to Disclose
Resmi Charalel, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Anum Aslam, MD, Ann Arbor , MI (*Abstract Co-Author*) Nothing to Disclose
Ahmed M. Gabr, MBChB, Portland, OR (*Abstract Co-Author*) Nothing to Disclose
Avinash R. Kambadakone, MD, Boston, MA (*Abstract Co-Author*) Research Grant, General Electric Company; Research Grant, Koninklijke Philips NV
Bradley M. Spieler, MD, New Orleans, LA (*Abstract Co-Author*) Nothing to Disclose
Vahid Yaghmai, MD, Orange, CA (*Abstract Co-Author*) Nothing to Disclose
Frank H. Miller, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Richard Kinh Gian Do, MD,PhD, New York, NY (*Abstract Co-Author*) Consultant, Bayer AG; Author, Reed Elsevier; Spouse, Author, Wolters Kluwer nv; Spouse, Data Monitoring Committee, Alk Abello
Claude B. Sirlin, MD, San Diego, CA (*Abstract Co-Author*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc
Mishal Mendiratta-Lala, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

joeyacoub@gmail.com

TEACHING POINTS

• This exhibit will review expected CT and MRI findings of HCC treated with arterial based therapies such as transarterial chemoembolization (TACE) and transarterial radioembolization (TARE) • Participants will learn to identify expected imaging characteristics which differentiate adequately treated from residual/recurrent disease • There will be a review of LI-RADS treatment response classification system, followed by a guide on how to apply LI-RADS treatment response categories (Nonviable, Equivocal and Viable) when interpreting imaging for HCC treatment response assessment after arterial based locoregional therapies.

TABLE OF CONTENTS/OUTLINE

• Background on arterial based locoregional therapies. • Overview of the LI-RADS treatment response categorization system. • Highlight limitations using size for HCC response assessment, and the importance of tumor necrosis and residual enhancement. • Case-based imaging review of expected imaging findings seen after TACE and TARE, including differences in response between TACE and TARE early post-treatment. • MR and CT case-based imaging review of the LI-RADS Treatment Response categories after TACE and TARE: LI-RADS Nonviable, LI-RADS Viable, and LI-RADS Equivocal.

GI177-ED-X

Images You Can`t Forget: The Importance of Barium in the Diagnosis of Esophageal Diseases

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Yumi Kimura Sandoval, BMBS, Mexico City, Mexico (*Presenter*) Nothing to Disclose
Ramiro Tapia Sosa, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Oralia C. Rico Rodriguez, MD, PhD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Yukiyoshi Kimura, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Jose A. Cienfuegos Alvear, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Ricardo Martinez Martinez, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Monica Munoz-Lopez, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Hee Jung Choi, BMedSc, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Lourdes M. Avila, MD, Tlalpan, Mexico (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

megukisa@hotmail.com

TEACHING POINTS

• Recognize the importance of baritated studies, in particular barium swallow in the diagnostic algorithm of esophageal pathology.• Learn about the epidemiology, risk factors, and clinical presentation of esophageal diseases. • Identify specific radiological signs of esophageal diseases. • Case-based review of the main radiologic features of each esopagheal disease through barium swallow.

TABLE OF CONTENTS/OUTLINE

1) Esophageal functional abnormalities - Reflux esophagitis - Barett`s esophagus2) Motility disorders - Achalasia - Pseudo-achalasia - Diffuse esophageal spasm - Presbyesophagus3) Structural abnormalities - Zenker`s diverticulum - Schatzki ring 4) Esophageal tumors -Benign - Malignant

GI178-ED-X

Cholangiopathies, Going Down the Rabbit Hole

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Carlos Casian Ruiz Velasco, MD, Distrito Federal, Mexico (*Presenter*) Nothing to Disclose
Maria Rebeca Arizaga Ramirez, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Israel Vicente Toledo Coronado, MD , Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Andres N. Fourzali Sabaag, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

The purpose of this exhibit is to expose radiologists to a series of cases that will help to assess and choose findings associated with inflammatory and infectious cholangiopathies, and also to recognize common etiologies and key imaging patterns of biliary diseases.

TABLE OF CONTENTS/OUTLINE

The cases will be presented in a quiz format. Key differential diagnostic points will be highlighted and reviewed in the discussion of each case. The list of cases includes: Primary sclerosing cholangitis, Eosinophilic secondary scleroing cholangitis, ischemic sclerosing cholangitis. Primary biliary cholangitis. IgG4 related disease. recurrent pyogenic cholangitis. HIV-associated cholangiopathy.

Printed on: 10/29/20

GI180-ED-X

MRI Findings in Complicated Crohn's Disease

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Davide Vitale, MD, Rome, Italy (*Presenter*) Nothing to Disclose
Francesca Maccioni, MD, Rome , Italy (*Abstract Co-Author*) Nothing to Disclose
Davide Bencardino, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Mariangela Lopez, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Carlo Catalano, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

davide.vitale@uniroma1.it

TEACHING POINTS

Understand the basic inflammatory changes in Crohn's disease with pathological correlations Describe effective protocols for MR imaging to identify pathology and its complications Recognize MR imaging findings relative to different CD complications Be aware of the clinical role of MR imaging in selecting different treatment options

TABLE OF CONTENTS/OUTLINE

- Definition and classification of different Crohn's disease phenotypes - Pathology of early inflammatory changes and their progression toward complicated disease - Gastrointestinal complications with radiological-pathological correlation: - Stricturing and obstructing disease - Penetrating disease: adhesions, sinus tracts, fistulas and abscesses - Malignant complications: adenocarcinoma - Extra-intestinal complications: - Perianal disease - Primary Sclerosing Cholangytis - Sacroileitis - MR imaging protocols - Clinical cases with emphasis on the imaging findings and radiological 'signs' of the different types of complications

GI181-ED-X

Multimodality Imaging of Abdominal Neoplasms with Tumor Thrombus: What Radiologists Should Know

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Kiyoyuki Minamiguchi, Kashihara, Japan (*Presenter*) Nothing to Disclose
Nagaaki Marugami, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Hideki Kunichika, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Kentaro Ishida, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Tetsuya Tachiiri, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Junko Takahama, MD, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Kimihiko Kichikawa, MD, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

The purpose of the exhibit is to recognize various cases of abdominal neoplasms with tumor thrombus, and to suggest a clinical significance such as differential diagnosis, complication, tumor staging and treatment approach.

TABLE OF CONTENTS/OUTLINE

Tumor thrombus is important in cancer patients, as the presence of tumor thrombus alters the prognosis and the treatment plan for the patient. Multimodality imaging plays a key role both in the detection of thrombus and in differentiating tumor from bland thrombus. Moreover, understanding the multimodality imaging of abdominal neoplasm with tumor thrombus leads us to narrow the differential diagnosis and to help resolve clinical situations. 1) Case presentation of abdominal neoplasms with tumor thrombus: a) Gastrointestinal tract: AFP producing gastric cancer and gastric neuroendocrine carcinoma, b) Liver: hepatocellular carcinoma (poorly differentiated) and liver metastasis of neuroendocrine carcinoma, c) Pancreas: ITPN with an associated invasive carcinoma, d) Kidney: renal cell carcinoma, e) Genitourinary tract: intravenous leiomyomatosis, f) Miscellaneous: leiomyosarcoma, reviewed with the radiological and clinicopathological findings. 2) Discussion: The clinical significance such as differential diagnosis, complication, tumor staging and treatment approach are mentioned.

GI182-ED-X

Updates on Radiological and Clinicopathological Findings of Solid Pseudopapillary Neoplasm

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Yuichi Shimohara, Kashihara , Japan (*Presenter*) Nothing to Disclose
Kiyoyuki Minamiguchi, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Hideki Kunichika, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Kentaro Ishida, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Chisa Yoneima, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Nagaaki Marugami, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Kimihiko Kichikawa, MD, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

The purpose of this exhibit is to present an overview of solid pseudopapillary neoplasm (SPN), and to update the knowledge radiologist should know by describing the imaging findings and clinical presentation.

TABLE OF CONTENTS/OUTLINE

SPN has the diverse radiological findings, as it contains varying amounts of degenerations, such as necrosis and hemorrhage, calcification and cystic change. So it is sometimes difficult for radiologists to differentiate SPN from other pancreatic tumors, such as ductal carcinoma, IPMN, SCN, NET, and ACC. Also SPN is rare in male patients. However the number of cases reported has been increasing. Radiologists should update knowledge about radiological and clinicopathological findings of SPN. 1) Case presentation of SPN: Typical and atypical cases are reviewed with the clinicopathological and radiological findings 2) Discussion: The knowledge about SPN, radiologist should know are updated and discussed

Printed on: 10/29/20

GI183-ED-X

Multimodality Imaging and Pathophysiology of Non-Mass-Forming Malignant Tumors

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Kiyoyuki Minamiguchi, Kashihara, Japan (*Presenter*) Nothing to Disclose
Nagaaki Marugami, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Katsutoshi Horiuchi, MD, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Tetsuya Tachiiri, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Chisa Yoneima, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Aki Takahashi, MD, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose
Kimihiko Kichikawa, MD, Kashihara, Japan (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

The purpose of the exhibit is to recognize various cases of non-mass-forming malignant tumors and to understand the pathophysiology of non-mass-forming malignant tumors on multimodality image.

TABLE OF CONTENTS/OUTLINE

Malignant tumors typically appear to form the mass in various organs. However, some tumors present as the non-mass-forming lesion, due to the cell property. Radiologists should be familiar with unique appearance of non-mass-forming malignant tumors by multimodality imaging. So understanding the pathophysiology of non-mass forming malignant tumors can lead us to make a correct diagnosis. 1) Case presentation of non-mass-forming malignant tumors: a) Gastric cancer:retroperitoneal metastases(kidney, bile duct and duodenum), iris metastasis, brain metastasis and colon metastasis, b)Bladder cancer:peritoneal carcinomatosis and gastric metastases, c) Malignant lymphoma:peritoneal lymphomatosis ,pulmonary malignant lymphoma and splenomegaly, d)Acute leukemia:pathological compression fracture, e) Peritoneal carcinoma:peritoneal carcinomatosis, reviewed with the radiological and clinicopathological findings. 2) Discussion: The correlation of pathophysiology with radiological manifestation, and differential diagnosis of non-mass-forming malignant tumors are discussed.

GI185-ED-X

The Complementary Value of Glancing at the CT Scout (Topogram) for Abdominal CT Interpretation

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Matthew H. Lee, MD, Camp Lejeune, NC (*Abstract Co-Author*) Nothing to Disclose
Meghan G. Lubner, MD, Madison, WI (*Abstract Co-Author*) Grant, Koninklijke Philips NV; Grant, Johnson & Johnson;
Vincent M. Mellnick, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Sanjeev Bhalla, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Perry J. Pickhardt, MD, Madison, WI (*Presenter*) Stockholder, SHINE Medical Technologies, Inc; Stockholder, Elucent Medical; Advisor, Bracco Group;

TEACHING POINTS

The purpose of this exhibit is: 1. To demonstrate the added value related to incorporating review of the CT scout (topogram) views for abdominal CT, using multiple illustrative examples. 2. To discuss potential pitfalls related to the CT scout view.

TABLE OF CONTENTS/OUTLINE

Overview - Primary purpose of the CT scout (topogram) view - Utility derived from "opportunistic" review for diagnostic interpretation Broad categories of added value (with case illustration): - Important scout findings outside the prescribed CT series range - Complementary evaluation of foreign bodies, implanted devices, and other dense structures - Evaluation of gas collections (bowel gas pattern, pneumatosis, extraluminal gas) - Evaluation of calcifications (urolithiasis localization for radiographs, tumoral calcification) - Complementary evaluation of trauma - Body wall assessment (calcifications, subcutaneous emphysema, cutaneous lesions) - Value added from the lateral scout view Pitfalls in CT scout interpretation - Analogous to conventional radiography (planar technique, lower contrast resolution) - Fluid-filled bowel (eg, closed-loop SBO) - Peritoneal calcification (vs. enteric contrast) Conclusion

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES — TOGETHER

GI186-ED-X

Volumetric Parameters of Functional MRI and Their Radiomic Features in Predicting HCC Tumor Differentiation

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Sanaz Ameli, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Bharath Venkatesh, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Roya Rezvani Habibabadi, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Li Pan, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Robert Grimm, Erlangen, Germany (*Abstract Co-Author*) Employee, Siemens AG Stockholder, Siemens AG Patent holder, Siemens AG
Robert Anders, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

sameli1@jhmi.edu

TEACHING POINTS

• To describe the role of volumetric functional MRI in predicting pathologic differentiation of HCCs. • To describe the role of radiomic tumor features on MRI in predicting the degree of differentiation of HCCs. • To highlight the advantage of non-invasive imaging approach in evaluating HCC degree of differentiation.

TABLE OF CONTENTS/OUTLINE

• Describe the Prevalence of HCC and the importance of precise patient selection for different treatments. • Describe the limitations of tumor biopsy. • Histopathologic slide of well-differentiated HCC vs. poorly-differentiated tumors. • Tumor segmentation in volumetric functional MRI. • Comparing volumetric ADC and volumetric venous enhancement between the well and poorly differentiated HCCs. • Using texture analysis and machine learning in extracting and analyzing HCC tumor features. • Comparing reconstructed well-differentiated HCC vs. poorly differentiated tumor.

GI187-ED-X

Application of Spectral CT in the Response Evaluation of HCC After Locoregional Therapy: A Combination of Low Radiation Dose and Spectral Images

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Eunice A. Lara Garcia, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose
Yumi Kimura Sandoval, BMBS, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Monica Chapa, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

eunice@ctcardiomexico.com

TEACHING POINTS

- Illustrate how the use of spectral CT tools improves the diagnosis and follow up after locoregional treatment in HCC. - Explain the uses of virtual monoenergetic images, iodine density images and effective anatomic number-based images (pre and post treatment) and how they can be compared to DSA images. - Exemplify the utility of virtual non-contrast images.

TABLE OF CONTENTS/OUTLINE

- Understanding spectral CT: A brief and simplified explanation - Spectral CT scanning technique for liver tumors focusing on the use of low radiation protocol - Definition of spectral CT images: Virtual non-contrast, virtual monoenergetic, iodine density and effective anatomic number-based images - Response evaluation: Comparing conventional vs. spectral CT images (pre and post treatment) - Illustrative cases of DSA and spectral CT images post treatment - Conclusions

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI188-ED-X

Common Patterns of Change in ADC Histogram of Hepatocellular Carcinoma Lesions Following Transarterial Chemoembolization and Their Relationship with Patients' Prognosis

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Sanaz Ameli, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Roya Rezvani Habibabadi, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

mshagha1@jhmi.edu

TEACHING POINTS

• Hepatocellular carcinoma is the most common primary malignancy in liver, which is typically associated with poor prognosis. • Transarterial chemoembolization (TACE) is a commonly used therapeutic modality in non-surgical management of HCC • Volumetric Apparent diffusion coefficient (vADC) and kurtosis of vADC histograms are novel MRI metrics proposed as independent early predictors of survival. • Increase in whole lesion vADC and increase in heterogeneity of tumor texture correlates with patients' prognosis and can potentially predict treatment response.

TABLE OF CONTENTS/OUTLINE

• Definition, epidemiology, and etiology of HCC along with available treatment options are described • Commonly used criteria for assessment of treatment response in HCC are explained, including novel functional MRI metrics describing the texture of tumors • Pre- and post-TACE images of HCC tumors with corresponding histograms are illustrated to compare the common patterns of change in heterogeneity of tissue following treatment • Different patterns of change in mean vADC value and vADC-kurtosis are combined together and illustrated with their corresponding patient's survival, to compare the expected prognosis between groups

GI189-ED-X

Upping Your Klatskin Game: Case-based Review with Intraoperative Correlation

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Peter D. Poullos, MD, San Carlos, CA (*Presenter*) Nothing to Disclose
Brendan Visser, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ppoullos@stanford.edu

TEACHING POINTS

At the conclusion of this activity, participants will be able to… 1. Recognize how Klatskin tumor location determines the type of liver resection 2. Identify anatomical variations of hepatic blood vessels and biliary drainage that guide surgical approach3. Recognize findings that may preclude surgical treatment4. Up your game in hepatobiliary tumor board and when talking to surgeon colleagues

TABLE OF CONTENTS/OUTLINE

Outline: Klatskin tumor classificationTumor staging using imagingImaging featuresSurgical approachesTen Representative cases illustrating surgical decision-making

Printed on: 10/29/20

GI190-ED-X

The Revised Atlanta Classification of Acute Pancreatitis: What Radiologists Must Know

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Stephanie D. Colvin, MD, Birmingham, AL (*Presenter*) Nothing to Disclose
Elainea N. Smith, MD, Birmingham, AL (*Abstract Co-Author*) Nothing to Disclose
Desiree E. Morgan, MD, Birmingham, AL (*Abstract Co-Author*) Institutional Research Grant, General Electric Company; Consultant, General Electric Company
Samuel J. Galgano, MD, Birmingham, AL (*Abstract Co-Author*) Research support, Blue Earth Diagnostics Ltd; Research support, Advanced Accelerator Applications SA
Kristin K. Porter, MD,PhD, Baltimore, MD (*Abstract Co-Author*) Stockholder, Pfizer Inc; Advisory Board, Bracco Group

For information about this presentation, contact:

kkporter@uabmc.edu

TEACHING POINTS

The revised Atlanta classification (RAC) for acute pancreatitis (AP) improved the original Atlanta classification by defining diagnostic criteria, differentiating types and phases, creating a tiered severity grading system, and clarifying local complications. This presentation aims to: 1. Review updates to the original Atlanta classification provided by the RAC.2. Discuss diagnostic criteria, types, phases, severity grading, and local complications established in the RAC.3. Provide examples of AP and its local complications on CT and MRI.4. Understand how to apply the RAC and its influence on management.5. Consider future directions for the classification of AP.

TABLE OF CONTENTS/OUTLINE

1. Why was the revised Atlanta classification (RAC) necessary?2. Review of the RAC• Diagnosis and types• Phases• Severity• Local complications3. Applying the RAC4. Shortcomings and Future Directions

GI191-ED-X

Multimodality Liver Imaging in Adults After Fontan Procedure

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Mariano Jose Parada-Blazquez, MD, Seville, Spain (*Presenter*) Nothing to Disclose
Daniel Rodriguez-Vargas, MD, Cadiz, Spain (*Abstract Co-Author*) Nothing to Disclose
Carmen Sendra-Fernandez, Seville, Spain (*Abstract Co-Author*) Nothing to Disclose
Juan Jose Borrero-Martin, Seville, Spain (*Abstract Co-Author*) Nothing to Disclose
Blanca Vargas-Serrano, MD, Seville, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

danielrodriguezvargas1990@gmail.com

TEACHING POINTS

Learning objectives: After viewing this presentation, participants will be able to recognize key imaging findings of FALD and of the nodules associated to the liver disease

TABLE OF CONTENTS/OUTLINE

Introduction: The Fontan procedure is a cardiac surgery performed in patients who have a single functional ventricle due to complex congenital heart disease. The procedure connects the systemic venous return to the pulmonary circulation. This palliative circuit extends the survival of the patients. On the other hand it also promotes systemic complications associated to elevated systemic pressure and to reduced cardiac output and hypoxia. Fontan associated liver disease (FALD) has been recognized in the last years as a potential serious complication of the procedure and involves the development of venous liver congestion, fibrosis and cirrhosis. Patients with FALD can develop hypervascular benign nodules and less fequently hepatocarcinoma (HCC). The appearance of benign nodules in FADL can sometimes be mistaken as HCC. In this presentation we discuss the spectrum of liver parenchymal abnormalities in adult patients with FALD studied with different imaging techniques: US, contrast-enhanced US, multiphasic CT and MRI. We also discuss radiologic characteristics of liver nodules associated to FALD.

GI192-ED-X

Let's Make it Easy: Differential Diagnosis in Bowel Wall Thickening

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Yasmina Lamprecht, MBBS, Santander, Spain (*Presenter*) Nothing to Disclose
Elena Yllera Contreras, MD, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Raul Pellon Daben, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Juan Crespo del Pozo, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Sara Sanchez Bernal, MD, Salamanca, Spain (*Abstract Co-Author*) Nothing to Disclose
Ana Belen Barba Arce, MD, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Elena Marin-Diez, MD, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Javier Azcona Saenz, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Enrique Montes, MD, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Victor Fernandez-Lobo, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Mercedes Acebo, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose
Francisco Gonzalez Sanchez, Santander, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yasmina.lamprecht@gmail.com

TEACHING POINTS

• To review the best imaging tool available for evaluating the colonic wall.• To revise the general features of the normal colonic wall. • To discuss the different imaging findings we may see in different types of colitis.• To study different pathologic entities that present with bowel wall thickening.• To make a straightforward algorithm that allows us, depending on the pattern of bowel wall thickening and enhancement, to determine the pathology we are facing.

TABLE OF CONTENTS/OUTLINE

• Introduction. • Imaging techniques: o US. o CT. o MRI.• Normal colon features: o Diameter. o Location. Colonic position variations. o Thickness of the wall. o Bowel wall enhancement.• Bowel wall thickening. o Mild or marked. o Symmetric or asymmetric. o Focal, segmental or diffuse. o Location. • Bowel wall attenuation: - Mucosa: hyperattenuating, hypoattenuating. - Submucosa: white, gray, black. - Target sign (edema, fibrosis, fat).• Differential diagnosis: o Idiopathic inflammatory bowel disease: ulcerative colitis vs Crohn disease. o Infectious colitis. o Neutropenic colitis. o Ischemic colitis. o Diverticulitis. o Tumor. o Pneumatosis. o Shock.• Algorithm.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI193-ED-X

MR of Rectal Cancer: How to Report It? A Practical Guide for Staging Report

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Daniela E. Simbler, MD, CABA, Argentina (*Presenter*) Nothing to Disclose
Maria F. Bambaci, MD, Buenos Aires, Argentina (*Abstract Co-Author*) Nothing to Disclose
Laura D. Mangiarotti, MD, Buenos Aires, Argentina (*Abstract Co-Author*) Nothing to Disclose
Stephanie Gross, MD, Buenos Aires, Argentina (*Abstract Co-Author*) Nothing to Disclose
Adriana Garcia, MD, Banfield, Argentina (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

danisimbler@gmail.com

TEACHING POINTS

-Recognize the radiological findings which change the staging and have relevance to treatment decisions. -Describe how the report should be done with the aim to improve the multidisciplinary work up.

TABLE OF CONTENTS/OUTLINE

-MR staging of rectal carcinoma. -MR parameters and technique necessary for correct staging. -Staging and reporting with sample cases.

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI194-ED-X

Cleaning Up Leak Studies: Reviewing Fluoroscopy Techniques to Optimize Detection of Leaks and Tears in the Esophagus and Stomach

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Stephany L. Ross, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Elizabeth V. Craig, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Frank H. Miller, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Jeanne M. Horowitz, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Linda C. Kelahan, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Linda.Kelahan@northwestern.edu

TEACHING POINTS

1. Explain the role of contrast mediums in leak studies. 2. Illustrate proper patient positioning based on literature review. 3. Examine the important role of scout films. 4. Outline a leak study protocol to improve standardization. 5. Review the most common locations of leaks following surgical procedures using illustrative cases.

TABLE OF CONTENTS/OUTLINE

1. Background: Why are leak studies performed and when should they be ordered? What findings on CT should prompt further evaluation with fluoroscopy? 2. Pre-procedural work-up: Review of commonly encountered surgical anatomy and patient history, as well as potential contraindications to the procedure. 3. Illustrating set up for a leak study: overview of contrast mediums, appropriate scout films, support pillows, and basins. 4. Procedure: Utilizing supine, LPO, and RPO positions to increase yield of discovering small leaks as illustrated by patient cases. 5. Post-procedure: Communicating results to patients and clinical team members to ensure appropriate management and minimizing post upper gastrointestinal study complications.

GI195-ED-X

Gastrointestinal Stromal Tumors: A Comprehensive Review of Clinical, Imaging, and Pathological Features

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Brian J. Weston, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Michael L. Douek, MD, MBA, Encino, CA (*Abstract Co-Author*) Nothing to Disclose
Steven S. Raman, MD, Santa Monica, CA (*Abstract Co-Author*) Consultant, Johnson & Johnson; Consultant, Bayer AG; Consultant, Merck & Co, Inc; Consultant, Amgen Inc; Consultant, Profound Medical Inc
Barbara M. Kadell, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Maitraya K. Patel, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

bweston@mednet.ucla.edu

TEACHING POINTS

Gastrointestinal stromal tumors are mesenchymal neoplasms that can present throughout the entire gastrointestinal tract, from the esophagus through the rectum. Though they comprise less than 1% of primary gastrointestinal tumors, the 5-year survival rate is greater than 75%, and patients require frequent imaging surveillance. Understanding the grading and staging of these tumors, their imaging appearance (computed tomography, PET-CT and magnetic resonance imaging), and expected post-treatment changes, helps the radiologist provide critical information to the clinical team. This exhibit will present an update on the evaluation and management of gastrointestinal stromal tumors with emphasis on the imaging of treatment response.

TABLE OF CONTENTS/OUTLINE

Epidemiology and clinical presentation of GISTs with correlation to distribution in the stomach, small and large bowel. Imaging appearance of primary and metastatic lesions on CT and MRI. Pathological correlation and grading. Tumor staging including RECIST, iRecist and Choi criteria. Update of treatment strategies including chemotherapy, immunotherapy, surgery, and ablation with imaging correlates for treatment response. Prognosis and the radiologist's role in disease monitoring.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES — TOGETHER

GI196-ED-X

Bioabsorbable Hemostatic Agents: Normal Appearance versus Postoperative Abdominal Abscess: CT Findings

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Ilse C. Frias, MD,MSc, Monterrey, Mexico (*Presenter*) Nothing to Disclose
Gabriela Sepulveda, MD, PhD, Monterrey, Mexico (*Abstract Co-Author*) Nothing to Disclose
Jesus H. Salinas, MD, Monterrey, Mexico (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ilse.frias@gmail.com

TEACHING POINTS

In postoperative patients with abdominal pain or fever, the possibility of an abscess is highly probable, especially when gas bubbles are found in the surgical bed. It is important for the radiologist to be aware of the existence and imaging characteristics of bioabsorbable hemostatic agents. Misidentifying them as an abscess may result in unnecessary aspiration attempts, drainage or reoperation. The primary goal is to describe CT findings of hemostatic agents and provide key elements that may help in differentiating them from a postoperative abscess.

TABLE OF CONTENTS/OUTLINE

1. Introduction 2. Review of commonly used hemostatic agents as well as their current indications. 3. Illustration of basic hemostatic agents imaging patterns and differential diagnostic considerations with case examples. 4. Scheme of CT imaging appearances of hemostatic agents and postoperative abdominal abscess to avoid misdiagnosis. 5. Conclusions

Printed on: 10/29/20

GI197-ED-X

Artificial Intelligence and Liver Segmentation: Current Applications and Future Directions

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Mohab Elmohr, MD, Houston, TX (*Presenter*) Nothing to Disclose
David Fuentes, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Sarah M. Palmquist, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ahmed Wagih Mohamed Saber Moawad, MBBS, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
John D. Hazle, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Khaled M. Elsayes, MD, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

kmelsayes@mdanderson.org

TEACHING POINTS

1. Understand the role of artificial intelligence (AI) in tumor segmentation. 2. Review the current clinical indications of liver segmentation. 3. Understand the pros and cons of various segmentation methods. 4. Understand the imaging requirements for a liver segmentation project. 5. Discuss future directions for liver segmentation.

TABLE OF CONTENTS/OUTLINE

1. The role of AI in liver segmentation. 2. Current applications of liver volumetry: a. Assessment of treatment response in hepatic malignancies. b. Prediction of patients' overall survival and time-to-progression. c. Future liver volume prior to major hepatectomy. d. Virtual surgical planning. 3. Illustration of available segmentation methods. 4. Comparison: pros and cons of each segmentation method. 5. Step by step tutorial for liver segmentation. 6. Current challenges facing automated liver segmentaion. 7. Future directions: a. Vascular sub-segmentation. b. Radiogenomics. c. Fully automated segmental volumetry. d. Automated volumetric RECIST measurements.

Printed on: 10/29/20

GI198-ED-X

Pictorial Tour of Unusual and Uncommon Metastases in Abdomen and Pelvis

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Mariano Volpacchio, MD, Buenos Aires, Argentina (*Presenter*) Nothing to Disclose
Mario G. Santamarina, MD, Vina del Mar, Chile (*Abstract Co-Author*) Nothing to Disclose
Teodoro M. Noguerol, MD, Jaen, Spain (*Abstract Co-Author*) Nothing to Disclose
Victoria C. Franco, MD, Buenos Aires, Argentina (*Abstract Co-Author*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier

For information about this presentation, contact:

mvolpacchio@gmail.com

TEACHING POINTS

Both abdominal and extraabdominal neoplasms frequently compromise various organs and spaces in abdomen and pelvis. Most of these sites and patterns have already been extensively described in the radiology literature. A busy oncologic practice occasionally discloses unexpected pathologic findings posing a diagnostic challenge in a particular population with several risks factors associated with both the primary neoplasm as well as treatment complications. Also many patients harbor risk for other potential alternative neoplasms. The purpose of this educational exhibit is to: 1. Provide a case based, pictorial review of the imaging features of different types and patterns of secondary involvement. 2. Explain and illustrate anatomical and pathogenic basis of tumor spread with emphasis on uncommon cases. 3. Discuss the key clinical and imaging features helpful to proper diagnosis and management.

TABLE OF CONTENTS/OUTLINE

A. Uncommon organ involvement B. Peritoneal spaces and ligaments C. Extraperitoneal spaces D. Miscellaneous

GI199-ED-X

Choosing the Best Test for Biliary Imaging: Re-Examining the Role of MRCP

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Anirudh V. Nair, MBBS, Ottawa, ON (*Presenter*) Nothing to Disclose
Blair MacDonald, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

dranirudhnair@gmail.com

TEACHING POINTS

Clarify the appropriate situations to recommend or proceed with an MRCP. Understand that, with increased availability of MRCP and favourable risk profile have led to the growth of its use in both appropriate and inappropriate (low value) cases. Identify multidisciplinary literature, and international guidelines which can facilitate decision making, and develop appropriate pathways to the best tests and therapeutic decisions. Describe the benefits, accuracy, risks and conditions in which other biliary imaging options fair compared to MRCP.

TABLE OF CONTENTS/OUTLINE

Backround use of MRCP. Clinical scenarios when MRCP is appropriate, marginally appropriate or inappropriate. (a) Appropriate use: Condition where MRCP is the clear winner. (b) Marginally appropriate or modified use: Routine MRCP is inferior to another test or needs to be modified to achieve the highest diagnostic accuracy. E.g. MRCP combined with CE-MRI or with hepatocyte specific contrast for T1 Cholangiogram. (c) Inappropriate use : growing overuse of MRCP which does not add value and may distract from optimal clinical pathway. Discuss sample clinical situations when ERCP, biliary scintigraphy, EUS, PTC, MR-Hepatobiliary contrast is more appropriate over MRCP. Future directions and summary.

GI200-ED-X

Hepatic Iron Quantification MR Imaging Based: Is it Possible to Make it Simple?

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Bruno A. Vento, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Rafael A. Santiago, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Fernanda G. Velloni, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Roberto Blasbalg, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

brunovento@hotmail.com

TEACHING POINTS

The purposes of this study are:to contextualize the hepatic iron overload, emphasizing the importance of non invasive quantification methods;to make a brief review of the available methods of MR Imaging-based iron quantification;to simplify its practice on routine examination.

TABLE OF CONTENTS/OUTLINE

Background:Main causes of hepatic iron deposition and body distribution;Liver biopsy;The role of non invasive quantification methods.MR Imaging protocol in different methods of iron quantification - pros and limitations:Liver-to-muscle signal intensity rate;T2 and R2 Relaxometry;T2* and R2* Relaxometry;Imaging Companies softwares - IDEAL IQ / LIVER LAB / mQUANT.How we do perform liver iron quantification in practice:Protocol parameters of acquisition;Imaging analysis;Iron overload as an incidental finding in the absence of clinical suspicion;Reporting the results;Dealing with confounders.

GI202-ED-X

The Potential Role of Cinematic Rendering of the Stomach in Lesion Detection and Classification: Early Observations in Clinical Practice

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Elliot K. Fishman, MD, Owings Mills, MD (*Presenter*) Institutional Grant support, Siemens AG; Institutional Grant support, General Electric Company; Co-founder, HipGraphics, Inc
Steven P. Rowe, MD, PhD , Baldwin, MD (*Abstract Co-Author*) Research funded, Progenics Pharmaceuticals, Inc
Linda C. Chu, MD, Lutherville, MD (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Teaching Points1. understand the potential role of cinematic rendering in the detection and classification of gastric pathology2.understand some of the potential advantages of cinematic rendering over classic display techniques including MPR, MIP and classic VRT.3. understand how the studies can be optimized using presets designed specifically for a range of gastric pathology

TABLE OF CONTENTS/OUTLINE

Data Acquisition and Display-CT scan protocols-role of MPR and MIP and classic VRT-potential role of cinematic rendering including work flow optimizationGastric Pathology-role of cinematic rendering in evaluation of gastric inflammatory disease-role of cinematic rendering in intraluminal display for detection of gastric polyps and other small tumors-role of cinematic rendering in detection and staging of primary and metastatic tumors to the stomachFuture Directions- how cinematic rendering can be used in routine clinical practice for evaluation of known or suspected gastric pathology- how to make cinematic rendering part of routine workflow

GI203-ED-X

The Cecum Revisited: A Multimodality Imaging Case-based Review of Common and Uncommon Cecal Diseases

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Cum Laude

Participants
Ulysses S. Torres, MD, PhD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Marina S. Fong, Taubate, Brazil (*Abstract Co-Author*) Nothing to Disclose
Lorena L. Silva, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Ana C. Ottaiano, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Dario A. Tiferes, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Luciana P. Chamie, MD, PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Angela H. Caiado, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Giuseppe D'ippolito, MD, PhD, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ulysses.torres@grupofleury.com.br

TEACHING POINTS

A wide range of conditions involving the cecum may be found in patients undergoing imaging work-up for conditions as various as right lower pain, diarrhea, fever and weight loss. Imaging provides an excellent evaluation of the cecal region and surrounding planes, although anatomical variations of the cecal location and absence of proper distention or prepare may be a challenge. Knowledge of the myriad of pathological processes involving the cecum and their main imaging findings may help to facilitate a prompt diagnosis and accurate management.

TABLE OF CONTENTS/OUTLINE

Introduction: Review of a miscellaneous of conditions that may affect the cecum. Case-based review: Representative cases will include inflammatory (Crohn's disease, ulcerative colitis, typhlitis, diverticulitis, tuberculosis) and vascular (intramural hematoma, ischemia) diseases, neoplasms (adenocarcinoma, lymphoma, Kaposi's sarcoma, GIST), volvulus, Ogilvie's syndrome with cecal perfuration, pneumatosis and pseudopneumatosis intestinalis etc. Take-home messages. References.

GI204-ED-X

'Where's That Sandwich?' Evaluating Esophageal Injuries on Esophagram CT

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Identified for RadioGraphics

Participants
Ashley Norton-Gregory, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose
Eric P. Segal, MD, Milwaukee, WI (*Abstract Co-Author*) Nothing to Disclose
Stacy D. O'Connor, MD, Wauwatosa, WI (*Abstract Co-Author*) Nothing to Disclose
Zachary R. Laste, MD, Milwaukee, WI (*Abstract Co-Author*) Nothing to Disclose
Joseph J. Budovec, MD, Brookfield, WI (*Abstract Co-Author*) Nothing to Disclose
Naveen Kulkarni, MD, Milwaukee, WI (*Abstract Co-Author*) Nothing to Disclose
Adam P. Zorn, MD, Milwaukee, WI (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

anorton@mcw.edu

TEACHING POINTS

Discuss the role of CT esophagram in assessing patients for esophageal leaks and pathology, as well as discussing when CT esophagram is indicated.Review the protocol for CT esophagram.Highlight pertinent findings on CT esophagram with comparison to fluoroscopy. Discuss how to create a CT esophagram program.

TABLE OF CONTENTS/OUTLINE

Utility of CT esophagram for esophageal leaks and pathologyProtocol variablesOral and IV contrast dose and administrationNoncontrast and IV contrast enhanced imagingProne imagingPertinent findings and case examplesComparison between fluoroscopy and CT Steps to develop a CT esophagram program

GI205-ED-X

Brushing Up on those Polyps: A Radiologist's Guide to Incidental Polyps

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Shimwoo Lee, Los Angeles, CA (*Presenter*) Nothing to Disclose
Anokh Pahwa, MD, Santa Monica, CA (*Abstract Co-Author*) Nothing to Disclose
Michael J. Nguyen, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Maitraya K. Patel, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Shaden F. Mohammad, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Background: Polyps are abnormal growth of tissue projecting from mucous membranes. Radiologists frequently encounter incidental polyps in various parts of the body. Guiding appropriate management of polyps is critical as certain polyps may harbor malignant potential or may herald an underlying polyposis syndrome. In addition, several malignancies may be polypoid in appearance on imaging, it is important to be aware of the differential diagnosis of a polypoid lesion and differentiating imaging characteristics to guide appropriate clinical management and treatment. Teaching Points:1. Review the types of polyps in various parts of the body, including the gallbladder, gastrointestinal, and endometrial and their differential diagnosis. 2. Illustrate the imaging features of these various polyps and their differential diagnosis across multiple modalities. Discuss ideal imaging techniques for evaluation and highlight any features that would raise concern for malignancy or malignant potential.3. Develop a management algorithm for incidentally found polyps.4. Review clinical manifestations and management of various polyposis syndromes

TABLE OF CONTENTS/OUTLINE

1. Background2. Gallbladder polyps3. Gastrointestinal polyps: gastric, small bowel and colonic4. Endometrial polyps 5. Review of polyposis syndromes

Printed on: 10/29/20

GI206-ED-X

How Do Metal Artifacts in the Pelvis Influence on CT Colonography? Utility of Ultra-High Resolution Metal Artifact Reduction Reconstruction

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Masahiro Suzuki, Chuo-Ku, Japan (*Presenter*) Nothing to Disclose
Mamiko Kobayashi I, Fukushima, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroshi Chiba I, Fukushima, Japan (*Abstract Co-Author*) Nothing to Disclose
Shun Muramatsu, RT, Fukushima, Japan (*Abstract Co-Author*) Nothing to Disclose
Kouji Hashimoto I, Fukushima, Japan (*Abstract Co-Author*) Nothing to Disclose
Yuma Ohashi, Otawara, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroshi Moriya, MD, Fukushima, Japan (*Abstract Co-Author*) Advisor, Ziosoft, Inc; Research Grant, Canon Medical Systems Corporation; Research Grant, Fukushima Prefectural Labor Health Center

TEACHING POINTS

1. Confirm the influence of hip replacement implant on CT colonography (CTC).2. Know the accuracy of metal artifact reduction reconstruction.3. Understand the effectiveness of high-precision CTC that is not influenced by metal artifacts.

TABLE OF CONTENTS/OUTLINE

Influence of metal artifacts on polyp measurement.Measurement error with or without metal artifact reduction reconstruction using CTC phantom.·Differences by resolution.·Differences depending on scanning parameters. CTC images where metal artifacts are greatly reduced.

GI207-ED-X

Don't Get Washed Out: Atypical Manifestations of Hepatocellular Carcinoma

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Hernan R. Bello Velez, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Zaid Mahdi, MBChB,PhD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Sadhna Nandwana, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Peter A. Harri, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Amir H. Davarpanahfakhr, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

hernanbello@emory.edu

TEACHING POINTS

Imaging findings alone are frequently sufficient for a specific diagnosis of hepatocellular carcinoma (HCC). A minority of cases pose a diagnostic dilemma to radiologists due to atypical appearance which may be related to uncommon histologic tumor subtype and unusual invasion patterns. After reviewing this exhibit, the learner should: 1. Recognize the caveats in the diagnosis of HCC. 2. Be familiar with uncommon subtypes of HCC and their imaging characteristics. 3. Identify "red flags" suggestive of atypical HCC necessitating further workup.

TABLE OF CONTENTS/OUTLINE

This educational exhibit will:1. Illustrate classic HCC imaging characteristics. 2. Illustrate atypical imaging features of pathologically-proven HCC focusing on: - Histologic subtypes including scirrhous, combined HCC-cholangiocarcinoma, sarcomatoid, diffuse cirrhosis-like, steatohepatitic, and fibrolamellar HCC among others. - Unusual dissemination patterns including vascular, biliary, peritoneal, lymphatic and locoregional invasion. 3. Summarize clinical and imaging "red flags" which should alert the radiologist of the possibility of an atypical case of HCC.4. Discuss mimickers of HCC such as adenoma, cholangiocarcinoma, angiomyolipoma, angiosarcoma, leiomyosarcoma, hemangioendothelioma, lymphoma, abscess, etc.

GI208-ED-X

Hyperintense Nodules on Hepatobiliary Phase Gadoxetic Acid-Enhanced MR Images

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Takamasa Nishimura, Nagasaki, Japan (*Presenter*) Nothing to Disclose
Hideki Ishimaru, MD, Nagasaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Yohei Ikebe, Nagasaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazuto Ashizawa, MD, Nagasaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Masataka Uetani, MD, Nagasaki, Japan (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

To illustrate various lesions that show hyperintesity on hepatobiliary phase (HBP) To describe the various mechanisms underlying the hyperintensity on HBP To categorize various hyperintense nodules according to underlying liver disease To present an organized approach to differential diagnosis based on imaging appearance.

TABLE OF CONTENTS/OUTLINE

Mechanisms underlying the hyperintensity on HBP (cellular uptake / non-specific pooling in the tumor's interstitium) Tumors or tumor like lesions showing high cellular uptake in association with/without cirrhosis Lesions showing non-specific pooling in the tumor's interstitium Imaging features that help characterize a hyperintense nodule (intranodular blood supply / pseudocapsule / ADC) Pitfall

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI209-ED-X

Make No Mistake: Multimodality Imaging of Splenosis Mimicking Other Pathologies

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Eleanor Gillis, MD, MS, Philadelphia, PA (*Presenter*) Nothing to Disclose
Maya Galperin-Aizenberg, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

eagillis@yahoo.com

TEACHING POINTS

The purpose of this exhibit is (1) to review the pathogenesis of and usual imaging findings in splenosis and (2) to discuss the use of multiple imaging modalities and their role in diagnosis of splenosis through the use of illustrative examples in which it mimicked more sinister pathologies.

TABLE OF CONTENTS/OUTLINE

Mechanism and pathogenesis of abdominal and thoracic splenosis Imaging features of splenosis in multiple modalities Role of imaging studies in diagnosis and avoidance of potentially morbid tissue sampling Illustrative cases to include: Pleural-based splenosis mimicking metastases; Peripancreatic splenosis mimicking neuroendocrine tumor; Omental splenosis mimicking pseudoaneurysm; Intrahepatic splenosis mimicking primary or secondary neoplasm; Pelvic splenosis mimicking lymphoma

Printed on: 10/29/20

GI211-ED-X

Artificial Intelligence for Early Detection of Pancreatic Cancer: Preliminary Observations and Challenges

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Satomi Kawamoto, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Seyoun Park, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Linda C. Chu, MD, Lutherville, MD (*Abstract Co-Author*) Nothing to Disclose
Alejandra Blanco, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Shahab Shayesteh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Saeed Ghandili, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Daniel Fadaei Fouladi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Alan Yuille, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ralph H. Hruban, Baltimore, MD (*Abstract Co-Author*) Board Member, miDiagnostics
Kenneth Kinzler, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bert Vogelstein, MD, Baltimore, MD (*Abstract Co-Author*) Founder, Personal Genome Diagnostics, Inc; Founder, Thrive Scientific; Advisor, Sysmex Corporation; Advisor, Eisai Co, Ltd; Advisor, CAGE; Advisor, Neophore; Advisor, Nexus; License agreement, Personal Genome Diagnostics, Inc; License agreement, Thrive Scientific; License agreement, Sysmex Corporation; License agreement, Eisai Co, Ltd; License agreement, CAGE; License agreement, Neophore; License agreement, Nexus
Elliot K. Fishman, MD, Owings Mills, MD (*Abstract Co-Author*) Institutional Grant support, Siemens AG; Institutional Grant support, General Electric Company; Co-founder, HipGraphics, Inc

For information about this presentation, contact:

skawamo1@jhmi.edu

TEACHING POINTS

• To learn the current status of artificial intelligence for early detection of pancreatic cancer • To discuss the limitations and challenges that need to overcome to improve performance • To learn future directions of artificial intelligence for early detection of pancreatic cancer using artificial intelligence

TABLE OF CONTENTS/OUTLINE

Early detection of pancreatic cancer is key for successful treatment of pancreatic cancer. Current status of artificial intelligence for detection of pancreatic cancer Imaging features for detection of pancreatic cancer using artificial intelligence Attenuating difference compared to the normal pancreatic parenchyma Shape/contour change of the pancreas Pancreatic ductal dilatation with abrupt termination Biliary ductal dilatation Vascular encasement Radiomics features Technical aspects which may influence the performance Challenges of artificial intelligence for detection of early pancreatic cancer Future directions

GI212-ED-X

A Multidisciplinary Approach for Program Development with Artificial Intelligence in Pancreatic Cancer: How We Fit In

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Satomi Kawamoto, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Seyoun Park, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Linda C. Chu, MD, Lutherville, MD (*Abstract Co-Author*) Nothing to Disclose
Alejandra Blanco, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Shahab Shayesteh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Saeed Ghandili, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Daniel Fadaei Fouladi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Alan Yuille, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ralph H. Hruban, Baltimore, MD (*Abstract Co-Author*) Board Member, miDiagnostics
Kenneth Kinzler, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bert Vogelstein, MD, Baltimore, MD (*Abstract Co-Author*) Founder, Personal Genome Diagnostics, Inc; Founder, Thrive Scientific; Advisor, Sysmex Corporation; Advisor, Eisai Co, Ltd; Advisor, CAGE; Advisor, Neophore; Advisor, Nexus; License agreement, Personal Genome Diagnostics, Inc; License agreement, Thrive Scientific; License agreement, Sysmex Corporation; License agreement, Eisai Co, Ltd; License agreement, CAGE; License agreement, Neophore; License agreement, Nexus
Elliot K. Fishman, MD, Owings Mills, MD (*Abstract Co-Author*) Institutional Grant support, Siemens AG; Institutional Grant support, General Electric Company; Co-founder, HipGraphics, Inc

For information about this presentation, contact:

skawamo1@jhmi.edu

TEACHING POINTS

To develop multidisciplinary collaboration in the successful development of artificial intelligence program for early detection of pancreatic cancer To discuss and define the roles of radiologists as a member of multidisciplinary team in development of artificial intelligence program To discuss advantages of multidisciplinary approach

TABLE OF CONTENTS/OUTLINE

Our multidisciplinary approach to develop computer programs for artificial intelligence for detection of early pancreatic cancer: radiologists, oncologists, geneticists, pathologists, computer scientists, computer students, and others. There are multiple steps to develop artificial intelligence in radiology including: Image acquisition Data collection Segmentation/annotation: supervised vs. semi-supervised vs. unsupervised Training and testing in deep network Reviewing results and feedback The roles and contributions of radiologists in development of artificial intelligence in radiology What each team member contributes to program development Advantages of multidisciplinary approach

GI213-ED-X

Uncommon Small Bowel Disorders on CT/MR Enterography

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Zachary S. Kelm, MD, PhD, Rochester, MN (*Presenter*) Nothing to Disclose
Daniel A. Adamo, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Shannon P. Sheedy, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Michael L. Wells, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Jeff L. Fidler, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

kelm.zachary@mayo.edu

TEACHING POINTS

1. Review uncommon small bowel disorders that may be encountered in CT/MR enterography.2. Discuss the imaging findings and clinical context which can enable the radiologist to narrow the small bowel disorder differential and guide the appropriate next steps of patient workup.

TABLE OF CONTENTS/OUTLINE

-Overview of CT and MR enterography technique-Overview of small bowel disorders manifesting with multiple or long segments of bowel wall thickening, divided by the following etiologies:--- Edema and impaired drainage--- Infection--- Hemorrhage--- Inflammation--- Infiltrative conditions--- Fibrosis--- Neoplastic and cancer-related treatment-Sample cases of uncommon small bowel disorders with description of clinical characteristics and common imaging findings

GI214-ED-X

Imaging of Cholangiocarcinoma: Its Risk Factors and Mimics

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Anna Starikov, MD, New York, NY (*Presenter*) Nothing to Disclose
Alexander Gavlin, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Andrea S. Kierans, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Sarah K. Oh, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Grace C. Lo, MD, Brooklyn , NY (*Abstract Co-Author*) Nothing to Disclose
Fernanda S. Mazzariol, MD, Bronxville, NY (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

1. Cholangiocarcinoma presenting as intra-hepatic, periductal infiltrating or intraductal mass harbors benign and malignant mimics. 2. Cholangiocarcinoma risk factors include: primary sclerosing cholangitis, biliary tract anomalies, cirrhosis, liver flukes, viral infections and biliary intraductal papillary neoplasm. 3. Confirming cholangiocarcinoma diagnosis and determining disease stage at diagnosis will influence treatment options and survival.

TABLE OF CONTENTS/OUTLINE

1. Illustrated examples of intra-hepatic mass forming, periductal infiltrating and intraductal cholangiocarcinoma and their mimics including: liver metastasis + spread along the portal triads, hepatocellular carcinoma + intraductal invasion, pyogenic abscess, Fasciola and Capillaria hepatica, benign biliary stricture, periportal lymphangitic metastases, hepatolithiasis, biliary cystadenoma / carcinoma, confluent hepatic fibrosis, IGG 4 related cholangiopathy. 2. Discussion of imaging key points in the staging of cholangiocarcinoma for treatment planning. 3. Discussion of imaging, surveillance and treatment of cholangiocarcinoma risk factors including: biliary intraductal papillary neoplasm, choledochal cyst, primary sclerosing cholangitis, anomalous choledochopancreatic junction, cirrhosis and hepatolithiasis.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI215-ED-X

Pictorial Review of Dynamic Contrast-Enhanced CT Colonography and Monoenergetic Imaging of Colon Cancers Using TwinBeam Dual Energy-CT

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Hiroyuki Horikoshi, MD, Otashi, Japan (*Presenter*) Nothing to Disclose
Takeshi Kawakami, MD, Ota, Japan (*Abstract Co-Author*) Nothing to Disclose
Aya Okayama, MD, Ota, Japan (*Abstract Co-Author*) Nothing to Disclose
Nariyuki Oya, MD, PhD, Ota, Japan (*Abstract Co-Author*) Nothing to Disclose
Tsukasa Akiyoshi, MD, PhD, Oota, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

koutan2@gunma-cc.jp

TEACHING POINTS

The preoperative TNM staging and mapping play an important role of colon cancer patients. Especially, 3D fusion image combining CT colonography and CT-angiography is useful mapping method for laparoscopic colectomy. TwinBeam dual energy (TBDE)-CT is a new technology that provides a unique way to perform dual energy scans and allows simultaneous acquisition of high and low energy datasets using single source system,enabling all applications utilizing iodine contrast. By using two different energies, comprehensive postprocessing is able to generate low-energy monoenergetic images to aid detection and characterization of colon tumors. The purpose of this exhibit is 1) To describe the technique of 3D fusion images combining CT colonography and CT-angiography. 2) To illustrate the virtual low energy monoenergetic images emphasizing iodine contrast. 3) To review the imaging-pathologic correlation of colon cancers using the CT colonography and low energy virtual monoenergetic images.

TABLE OF CONTENTS/OUTLINE

The content organization of this exhibit is: 1. Utility of the 3D fusion images combining CT colonography and CT-angiography for laparoscopic colectomy. 2.Illustration of low energy monoenergetic images of colon cancers. 3. Review of the imaging-pathologic correlation of colon cancers using the CT colonography and low energy virtual monoenergetic images.

Printed on: 10/29/20

GI216-ED-X

Utility of MRI and MRCP in Imaging of Post-Operative Pancreas

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Viswanath Anand Chidambaram, MBBS, Singapore , Singapore (*Presenter*) Nothing to Disclose
Temel Tirkes, MD, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose
Fatih Akisik, MD, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

- To discuss the surgical anatomy of common pancreatic surgeries - To discuss the use of secretin administration for comprehensive evaluation of the pancreatic ductal system - To illustrate the post-operative findings and various complications following pancreatic surgeries

TABLE OF CONTENTS/OUTLINE

- Surgical anatomy of common pancreatic surgeries - MRI and MRCP protocols - Normal and expected MR findings of the post-operative pancreas - Post-surgical immediate and late complications o Post-operative collections o Pancreatitis o Infectious complications such as hepatic abscess, cholangitis o Surgical anastomotic strictures and leaks o Vascular complications such as aneurysm, venous thrombosis

Printed on: 10/29/20

GI217-ED-X

Transjugular Intrahepatic Portosystemic Shunt: Indications, Evaluation, and Complications with Multimodality Correlation

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Shrey Patel, MD, Houston, TX (*Presenter*) Nothing to Disclose
Steven S. Chua, MD, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

shrey.patel@uth.tmc.edu

TEACHING POINTS

Provide a broad overview for the indication and rationale behind TIPS placement. Detail the relevant anatomy on multiple modalities for placement/followup of TIPS. Expected immediate hemodynamic changes. Normal function and physiology of TIPS on routine followup. Multimodality correlates of various TIPS complications.

TABLE OF CONTENTS/OUTLINE

We will provide an overview and pathophysiology of portal hypertension with an emphasis on indications for TIPS placement. The relevant anatomy will be detailed on various modalities. We will demonstrate certain expected physiologic changes which occur immediately after creation of a TIPS (change in pressure gradients, reversal of flow in portal venous branches, and increased flow in the hepatic artery). Next, we will provide a 'normal' doppler examination as this is the means that many clinicians use to followup TIPS efficacy. Furthermore, we will detail the indications for obtaining a doppler examination to optimize patient care and the utilization of resources. Common complications will also be provided with an emphasis on multimodality correlation. Examples include immediate occlusion, in-stent stenosis, and various hematomas. Finally, we will attempt to elucidate common pitfalls in the interpretation of a doppler examination (as this is the most commonly used modality to initially 'screen' TIPS dysfunction).

GI218-ED-X

Inguinal Hernias: A Review of Anatomy and Interesting Cases

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Sarah Hogan, BSC, St. Johns, NL (*Presenter*) Nothing to Disclose
Angus J. Hartery II, MD, St Johns, NL (*Abstract Co-Author*) Nothing to Disclose
Melissa Skanes, MD, St John's, NL (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

seh663@mun.ca

TEACHING POINTS

Teaching Points:1. To review the epidemiology of groin hernias, both inguinal and femoral2. List the risk factors in development of groin hernias 3. Review the surgical and CT anatomy of the inguinal region4. Review the radiologic diagnostic criteria for inguinal and femoral hernias 5. Apply the previous teaching points to a CT collection of interesting groin hernias

TABLE OF CONTENTS/OUTLINE

Outline:1. Definition of groin hernias2. Epidemiology of groin hernias3. Complications4. Surgical Management5. Surgical Anatomy6. CT Anatomy7. Interesting cases including bilateral inguinal hernias, bladder containing hernia, stent containing hernia, femoral hernia, pantaloon hernia, appendicitis femoral hernia, and direct and indirect amyand hernias.

GI219-ED-X

Internal Hernias: Using Anatomic Landmarks to Make the Diagnosis

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Elizabeth A. Han, MD, Royal Oak, MI (*Presenter*) Nothing to Disclose
Craig N. Basmaji, MD, Bloomfield Hills, MI (*Abstract Co-Author*) Nothing to Disclose
Monisha Shetty, MD, Royal Oak, MI (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Elizabeth.Miller2@beaumont.org

TEACHING POINTS

The purpose of this exhibit is: • To illustrate key CT imaging features of surgically proven internal hernias, including the uncommon pericecal, transverse mesocolon-related and sigmoid mesocolon-related subtypes, which can be difficult to diagnose, leading to high morbidity and mortality • To highlight each internal hernia subtype anatomy with an accompanying illustrated diagram • To underscore important anatomic landmarks for each internal hernia subtype using multiple choice questions • To emphasize clinical implications of an internal hernia delayed diagnosis

TABLE OF CONTENTS/OUTLINE

• Internal hernias frequency, hernia orifice, and morbidity/mortality of a delayed diagnosis • Multiplanar CT imaging of surgically proven internal hernia cases including: o pericecal hernias o transverse mesocolon-related hernias o sigmoid-mesocolon-related hernias o paraduodenal hernias o foramen of Winslow hernias o transomental hernias o Roux-en-Y anastomosis related hernias • Key imaging characteristics including configuration of bowel, mesenteric changes, and bowel wall enhancement patterns • Accompanying illustrated diagrams and multiple-choice questions to emphasize the important anatomic landmarks and configurations of each internal hernia subtype

GI220-ED-X

Complications of Inflammatory Bowel Disease: Be Aware to Look Beyond the Intestine

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Galan Itxaso, MBBCh, Madrid, Spain (*Presenter*) Nothing to Disclose
Lourdes del Campo, PhD, Madrid , Spain (*Abstract Co-Author*) Nothing to Disclose
Pablo Rodriguez Carnero, MD, Madrid, Spain (*Abstract Co-Author*) Research funded, Bracco Group
Jose M. Munoz, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Carmen Idoate, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Carmen de Benavides, Madrid , Spain (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

- To highlight the importance of looking beyond the bowel in Computed Tomography (CT) and Magnetic Resonance (MR) enterography performed on patients with inflammatory bowel disease (IBD), so that no extraintestinal manifestations are inadvertently ignored.- To describe the radiological features of the main extraintestinal complications of IBD, including drug-induced disorders.

TABLE OF CONTENTS/OUTLINE

CT and MR enterography are being performed with greater frequency in IBD, as these are crucial not only to confirm diagnosis, but also to evaluate response to treatment and identify complications. Up to 47% of patients with IBD have extraintestinal manifestations, such as hepatobiliary, pancreatic, genitourinary, musculoskeletal, pulmonary, cardiac or drug-induced disorders that can be diagnosed at CT and MR enterography. Additional imaging examinations may be warranted.Extraintestinal complications can be the first symptoms of IBD and sometimes may not parallel the bowel inflammation evolution, though they generally follow the clinical course of the disease and, in fact, they impact life quality, morbidity, and mortality. In order to early diagnose these extraintestinal manifestations; radiologists should always be aware of them when evaluating CT or MR enterography in IBD patients.

GI221-ED-X

Perivascular Epithelioid Cell Tumors (PEComas) of the Abdomen: Imaging Features and Clinicopathologic Correlates

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Hamed Kordbacheh, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Rita Maria Lahoud, MD, Boston, MA (*Presenter*) Nothing to Disclose
Anushri Parakh, MBBS, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Jessica Munck, Northford, CT (*Abstract Co-Author*) Nothing to Disclose
Peter F. Hahn, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Mukesh G. Harisinghani, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

hkordbacheh.md@gmail.com

TEACHING POINTS

Perivascular Epithelioid Cell Tumors (PEComa) are a rare family of mesenchymal neoplasms that can arise in multiple locations, including the abdominal viscera. They can mimic other neoplasms such as sarcomas. This family of tumors includes angiomyolipomas, clear cell 'sugar' tumors of the lung, lymphangioleiomyomatoses, and others. Histologically, they consist of sheets and nests of spindle-shaped epithelioid cells around vessel walls, without normal tissue counterparts. They express both melanocytic markers (HMB-45, melan-A) and smooth muscle markers (actin, desmin). Clinical manifestations depend on the involved organ and on tumor type, size, and invasiveness. They exhibit non-specific imaging features. PEComas appear as enhancing, well-circumscribed masses with both solid and cystic components on contrast-enhanced CT. They usually appear hypo- to isointense on T1 and heterogeneously hyperintense on T2, on MR. On ultrasound, they appear as heterogeneous, hypervascular masses

TABLE OF CONTENTS/OUTLINE

I. Introduction: a. Brief History b. Definition II. What are PEComas? a. Origin b. Epidemiology c. Location d. Histology and Molecular Markers e. Classification f. Clinical manifestations III. PEComas across Multiple Imaging Modalities a. CT b. MRI c. Ultrasound d. Nuclear Imaging IV. Differential Diagnosis V. Management and Follow-up VI. Take-home Messages

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI222-ED-X

Radiology After Hours: CT Diagnosis of Acute Colonic Pathologies

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Sandeep P. Reddy, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Kheng L. Lim, MD, Bala Cynwyd, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Kheng.Lim@pennmedicine.upenn.edu

TEACHING POINTS

Computed Tomography (CT) imaging is the default workhorse in the initial evaluation of acute processes in the abdomen and pelvis. As such, radiologists are in a position to add value to the care of patients. The purpose of this exhibit is: To review the various presentation of patients with acute colonic pathologies. To discuss the imaging findings that lead to accurate and timely diagnosis of colonic pathologies. To present ways radiologists can enhance their roles in patient care throughout the patient journey through the healthcare system.

TABLE OF CONTENTS/OUTLINE

In this exhibit, we present common and uncommon etiologies of acute colonic pathology, as well as pearls and pitfalls of arriving at a diagnosis. We present real cases following the patient through the healthcare system, imaging diagnosis with correlation to laboratory data (when applicable) and illustrate ways of achieving accurate diagnosis and avoiding errors. Teaching points highlighting the importance of utilization of electronic medical records are presented. Brief overview of embryology of the colon, normal and variant colonic anatomy, and its relationships to surrounding abdominopelvic structures. Cases showing acute colonic pathology from congenital, infectious, inflammatory, traumatic and neoplastic etiologies.

Printed on: 10/29/20

GI223-ED-X

A Practical Guide of Locoregional Treatment for Patients with Hepatocellular Carcinoma

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Ana I. Oliveira, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Brunna Oliveira, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Natally Horvat, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Publio C. Viana, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Giovanni G. Cerri, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Marcos R. Menezes, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

anaisabelladeoliveira50770@gmail.com

TEACHING POINTS

´ Understand the role of locoregional therapies in the treatment of hepatocellular carcinoma (HCC) and main guidelines ´ Comprehend its mechanism of action, indications, contraindications and complications ´ Recognize post-treatment expected imaging features and most common pitfalls ´ Be familiar with future directions of imaging assessment of HCC response to treatment

TABLE OF CONTENTS/OUTLINE

´ Introduction HCC epidemiology and risk factors Main treatment guidelines of HCC Indications for locoregional therapies ´ Locoregional Therapies of HCC Mechanism of action, indications, contraindications, complications and efficacy of the following treatments: a. Percutaneous Ethanol Injection b. Radiofrequency Ablation c. Cryoablation d. Microwave Ablation e. Irreversible Electroporation f. Transarterial Embolization g. Conventional Transarterial Chemoembolization h. Drug Eluting Beads Transarterial Chemoembolization i. Transarterial Radioembolization j. External Beam Radiation Therapy ´ Combined Therapies Role of combined local and systemic therapies ´ Assessment Of Treatment Response Current criteria of treatment response Imaging interpretation a. Expected Imaging Features b. What to report c. Limitations and pitfalls d. Didactic illustrative sample cases ´ Future Directions What is on the horizon for locoregional treatment of HCC

Printed on: 10/29/20

GI224-ED-X

In Another Vein: Imaging of Abdominopelvic Venous Vascular Invasion Beyond HCC and RCC

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Identified for RadioGraphics

Participants
Ryan E. Bailey, MD, Jacksonville, FL (*Presenter*) Nothing to Disclose
Jordan LeGout, MD, Jacksonville , FL (*Abstract Co-Author*) Nothing to Disclose
Andrew Bowman, MD,PhD, Jacksonville, FL (*Abstract Co-Author*) Nothing to Disclose
Lauren F. Alexander, MD, Jacksonville, FL (*Abstract Co-Author*) Spouse, Stockholder, Abbott Laboratories; Spouse, Stockholder, AbbVie Inc; Spouse, Stockholder, General Electric Company
Candice W. Bolan, MD, Jacksonville, FL (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Reviewing the appearance of venous tumor thrombus on US, CT, and MRI Recognizing the imaging appearance of tumors prone to venous vascular invasion Identifying the differential diagnosis of tumors based on venous site Understanding mimickers of tumor thrombus and tips for confident diagnosis

TABLE OF CONTENTS/OUTLINE

1. Introduction a. HCC, RCC, and other tumor types b. Clinical importance 2. Imaging tips for confident diagnosis a. US, CT, and MRI 3. IVC tumor thrombus a. Differential with Case Examples i. HCC/RCC ii. Adrenocortical carcinoma iii. Leiomyosarcoma (LMS) 4. Splanchnic veins a. Pancreatic neuroendocrine tumor b. Carcinoid c. Adenocarcinomas 5. Smaller veins a. LMS b. Organ specific review 6. Benign Tumors a. Renal angiomyolipoma b. Intravenous leiomyoma 7. Mimickers a. Pylephlebitis b. Flow artifacts c. Cavernous transformation 8. Summary

Printed on: 10/29/20

GI225-ED-X

Pancreatic Ductal Adenocarcinoma and Its Variants: Pearls and Perils from the Radiologic Pathology Archives

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Khoschy Schawkat, MD, Boston, MA (*Presenter*) Nothing to Disclose
Maria A. Manning, MD, Silver Spring, MD (*Abstract Co-Author*) Nothing to Disclose
Jonathan N. Glickman, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Koenraad J. Mortele, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

kschawka@bidmc.harvard.edu

TEACHING POINTS

LEARNING OBJECTIVES: 1. Describe the radiologic features of PDAC and its variants, with pathologic correlation. 2. List the most important imaging findings for differentiating pancreatic ductal adenocarcinoma from its variants and achieving an accurate differential diagnosis. 3. Discuss the prognostic landscape of PDAC and its variants. TEACHING POINTS 1. To a certain extent all ductal pancreatic tumors are 'mucinous' as the hallmark of ductal differentiation in pancreatic tumors is mucin production. 2. At histopathology most PDAC are well to moderately differentiated and typically desmoplastic stromal reaction is associated. 3. Adenosquamous carcinoma is pathologically defined as a mixed tumor with ductal and squamous differentiation (at least 30%).

TABLE OF CONTENTS/OUTLINE

Introduction WHO classification of pancreatic adenocarcinoma Histologic subtypes: - "Typical" tubular adenocarcinoma - Adenosquamous carcinoma - Mucinous adenocarcinoma - Hepatoid carcinoma - Medullary carcinoma - Signet ring cell carcinoma - Undifferentiated carcinoma - Undifferentiated carcinoma with osteoclast-like cells Differential diagnosis Conclusion For each histologic subtype: - Definition/epidemiology/clinical features - Pathologic features - Imaging features - Treatment and prognosis

GI226-ED-X

Artificial Intelligence (AI) for CT Colonography: The New Horizons of Colorectal Screening

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Yasuji Ryu, MD, Kanazawa, Japan (*Presenter*) Nothing to Disclose
Janne J. Nappi, PhD, Boston, MA (*Abstract Co-Author*) Royalties, Hologic, Inc Royalties, MEDIAN Technologies
Hiroyuki Yoshida, PhD, Boston, MA (*Abstract Co-Author*) Patent holder, Hologic, Inc; Patent holder, MEDIAN Technologies;

For information about this presentation, contact:

yoshida.hiro@mgh.harvard.edu

TEACHING POINTS

AI can be used to enhance radiologists' performance in CT colonography (CTC). The teaching points of this exhibit are (1) to explain the role of CTC in colorectal screening, (2) to introduce learners to the uses of AI in CTC, and (3) to demonstrate how AI enhances radiologists' diagnostic performance in CTC.

TABLE OF CONTENTS/OUTLINE

1. Introduction. The role of CTC in colorectal screening. The potential benefits of AI in CTC. 2. Laxative-free CTC. Review uses of AI in laxative-free CTC. Present clinical case studies demonstrating the benefits of AI in electronic cleansing and polyp detection. 3. Flat polyps. Review how AI helps to detect flat polyps in CTC. Present clinical case studies demonstrating the benefit of AI in detecting flat polyps. 4. Radiation dose. Review how AI makes it possible to minimize radiation dose by use of advanced image reconstruction and single-position reading. Present clinical case studies demonstrating dose reduction in single- and dual-energy CTC. 5. The future of AI in CTC.

Printed on: 10/29/20

GI227-ED-X

How to Predict the Intra-Abdominal Adhesion by CT Colonography

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Mototaka Miyake, MD, Tokyo, Japan (*Presenter*) Nothing to Disclose
Kazunosuke Yamada, Ota, Japan (*Abstract Co-Author*) Nothing to Disclose
Gen Iinuma, MD, PhD, Chuo-ku , Japan (*Abstract Co-Author*) Nothing to Disclose
Masahiko Kusumoto, MD, Chuo-ku , Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

mmiyake@ncc.go.jp

TEACHING POINTS

To predict the presence of the intra-abdominal adhesions before laparoscopic surgery and robotic surgery is an important factor in planning the surgical approach, thereby minimizing the risk of complications. Barium enema used to be used for a certain period to estimate the presence of the intra-abdominal adhesions. Some imaging findings by barium enema have been known as the sign to predict the degree of the intra-abdominal adhesions. CT colonography (CTC) is a more precise tool than barium enema for assessing the whole anatomy of the colon. In addition, in some situations, we can estimate the presence of the intra-abdominal adhesions by CTC. In this education exhibit, 1. To show the correlation between CTC imaging findings and the adhesion sites confirmed during surgery. 2. To familiarize the audience with the representative case series and to understand key imaging findings suggesting the presence of the adhesions.

TABLE OF CONTENTS/OUTLINE

1. Pathogenesis of the intra-abdominal adhesions. 2. Review of the imaging findings of barium enema suggesting the presence of the intra-abdominal adhesions. 3. To show the case series with the correlation between various CTC images especially three-dimensional colon map (so-called, air-images) and the intra-abdominal adhesion sites confirmed during surgery.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI228-ED-X

Ano-Rectal Tumors: Radiologist to the Rescue

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Swati Sharma, MD, Jacksonville, FL (*Presenter*) Nothing to Disclose
Chidi T. Nwachukwu, MD, Jacksonville, FL (*Abstract Co-Author*) Nothing to Disclose
Dheeraj Reddy Gopireddy, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Chandana G. Lall, MD, Orange, CA (*Abstract Co-Author*) Nothing to Disclose
Smita Sharma, MBBS, Jacksonville, FL (*Abstract Co-Author*) Nothing to Disclose
Silvana C. Faria, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Khaled M. Elsayes, MD, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose
Hina Arif, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Zahra Kassam, MD, London, ON (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

swati.sharma@jax.ufl.edu

TEACHING POINTS

The objectives of this exhibit are to:1. Review imaging features of rectal adenocarcinoma2. Identify rectal tumors by location3. Learn about rare rectal tumors through cases4. Illustrate the key imaging findings of these tumors5. Understand the role of MRI as a key diagnostic tool for rectal tumors

TABLE OF CONTENTS/OUTLINE

1. Background of ano-rectal tumors2. Ano-rectal anatomy3. Imaging features of rectal adenocarcinoma4. Classification of ano-rectal tumors by location of origin5. Case illustrations6. Summary

Printed on: 10/29/20

GI229-ED-X

Vascular Complications of Pancreatitis: The Common, the Obscure, and the Deadly

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Matthew T. Stib, MD, Barrington, RI (*Presenter*) Nothing to Disclose
Nirav Makwana, MD, Providence, RI (*Abstract Co-Author*) Nothing to Disclose
Adib R. Karam, MD, Shrewsbury, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

matthew.stib@lifespan.org

TEACHING POINTS

To review the various vascular complications related to pancreatitis including: hemorrhagic pancreatitis, pseudoaneurysm and rupture, hemorrhage complicating pseudocysts, intrasplenic and subcapsular hematoma, occult pancreatic duct bleeding (hemosuccus pancreaticus) and venous thrombosis. Demonstrate the various multimodality imaging appearances of the various vascular complications. Describe the potential treatment options and role for interventional radiology.

TABLE OF CONTENTS/OUTLINE

• Introduction/Background. • Epidemiology, risk factors and pathophysiology of the vascular complications related to pancreatitis. • Imaging findings with example cases of each condition. • Treatment and role of interventional radiology. • Conclusion.

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES — TOGETHER

GI230-ED-X

Small in Stature but Big in Show: Imaging Appearances of the Most Commonly Encountered Gallbladder Conditions

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Melvy S. Mathew, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mmathew@radiology.bsd.uchicago.edu

TEACHING POINTS

To identify gallstones and stone-associated conditions on imaging To review complications related to cholecystitis To recognize the imaging features that distinguish the most commonly encountered cholecystitic entities

TABLE OF CONTENTS/OUTLINE

Gallstones on imaging Acute cholecystitis Severe forms of cholecystitis (e.g., gangrenous cholecystitis and emphysematous cholecystitis) and other stone-related complications (including gallbladder rupture, acute pancreatitis, Mirizzi syndrome, gallstone ileus, an inflamed gallbladder extending into a parastomal hernia) Adenomyomatosis (pathogenesis, patterns of distribution, varied appearances on imaging) Gallbladder cholesterol polyp, current recommendations for follow-up Gallbladder adenocarcinoma Metastases to the gallbladder Summary

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES — TOGETHER

GI231-ED-X

Track the Vessel to Crack the Case: A Quiz-based Review of Challenging Vascular Diagnoses in the Abdomen and Pelvis for Trainees

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Identified for RadioGraphics

Participants
Theodore T. Pierce, MD, Boston, MA (*Presenter*) Nothing to Disclose
Vinay Prabhu, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Vinit Baliyan, MBBS, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Sandeep S. Hedgire, MD, Lexington, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ttpierce@partners.org

TEACHING POINTS

1. To identify the unique and subtle constellation of imaging findings associated with primary and secondary diseases of the blood vessels for the benefit of radiology residents and fellows. 2. To better appreciate that vascular diseases may appear less conspicuous on imaging not dedicated for vascular assessment. 3. To increase awareness of uncommon and subtle vascular pathologies to avoid misdiagnosis.

TABLE OF CONTENTS/OUTLINE

We present a case-based quiz of key vascular pathologies unique to the abdomen and pelvis. Cases will be presented as unknown cases with subsequent diagnoses and teaching points provided for each case. Diagnoses will include: Portal venous system: -Portal vein cavernous transformation -Portal vein tumor thrombus -Post operative portomesenteric thrombus -Pseudocyst portal vein fistula -Small bowel ischemia from superior mesenteric vein thrombus Systemic veins: -Absent inferior vena cava -Deep venous thrombosis -Superior vena cava obstruction Arteries -Aortitis -Leriche syndrome -Fibromuscular dysplasia -Superior mesenteric artery dissection Other -Post biopsy arteriovenous fistula -TIPS stent occlusion -Vascular involvement in systemic diseases and syndromes

GI232-ED-X

Ins and Outs of Budd-Chiari Syndrome (BCS): A Pictorial Review of Vascular Derangements in BCS

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Roberto B. Kutcher, MD, Worcester, MA (*Presenter*) Nothing to Disclose
Hao Xu, Xu-zhou, China (*Abstract Co-Author*) Nothing to Disclose
Hai Bin Shi, MD, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Venkatesh A. Murugan, MBBS , Worcester, MA (*Abstract Co-Author*) Nothing to Disclose
Derek M. Chicarilli, MD, Worcester, MA (*Abstract Co-Author*) Nothing to Disclose
Ducksoo Kim, MD, Dover, MA (*Abstract Co-Author*) Nothing to Disclose
Sean W. Wilson, MD, Newton, MA (*Abstract Co-Author*) Nothing to Disclose
Young H. Kim, MD, Worcester, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

roberto.kutcher-diaz@umassmemorial.org

TEACHING POINTS

Become familiar with the demographic and etiologic differences of the two types of Budd Chiari Syndrome (BCS): Classic type and Hepatic Vena Cava (HCV) type Identify the characteristics that distinguish hepatic vein and inferior vena cava obstructions of Classic-BCS and HCV-BCS Identify the collateral circulation that develop in response to BCS and the predilection of each subtype for particular collateral pathways Recognize the various potential complications associated with BCS collaterals

TABLE OF CONTENTS/OUTLINE

1. Clinical characteristics of Classic BCS and HCV-BCS 2. Imaging features of obstructive lesions in Classic BCS versus HCV-BCS a. Distribution of lesions b. Morphology of lesions c. Mimics of obstructive lesions 3. Collateral pathways in Classic BCS versus HCV-BCS a. Intrahepatic collaterals b. Hepatic-systemic collaterals c. Caval collaterals 4. Complications of collateral circulation in BCS

Printed on: 10/29/20

GI233-ED-X

A Trip Through the Intestine: A Review of Small Bowel Follow Through

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Melissa P. Solano, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose
Yean P. Silva Hidalgo, MD, Mexico, Mexico (*Abstract Co-Author*) Nothing to Disclose
Yukiyosi Kimura-Fujikami, MD, Mexico, Mexico (*Abstract Co-Author*) Nothing to Disclose
Eva A. Izquierdo Echavarri, MD, CD.MX. , Mexico (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

mao.pame@gmail.com

TEACHING POINTS

To explain the utility of small bowel follow through examination (SBFT) To recognize a pattern approach for the wide spectrum of abnormalities found on barium studies and stablish a differential diagnosis. To identify morphologic alterations and motility disorders in the small bowell. To describe a properly performed smallbowel follow-through examination.

TABLE OF CONTENTS/OUTLINE

Introduction Indications and contraindications Procedure and technique Normal findings (anatomy) Abnormalities: Congenital inflammatory Malabsorption Obstruction Neoplasic Postoperative small bowel Others Key points Summary

Printed on: 10/29/20

GI234-ED-X

Spectrum of Magnetic Resonance Imaging in Complicated Choledochal Cysts

All Day Room: GI Community, Learning Center Digital Education Exhibit

FDA Discussions may include off-label uses.

Participants
Shahad Al Bayati, MD, Tucson, AZ (*Presenter*) Nothing to Disclose
Bobby T. Kalb, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Dheeraj Reddy Gopireddy, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Neeraj Lalwani, MD, Winston Salem, NC (*Abstract Co-Author*) Nothing to Disclose
Chandana G. Lall, MD, Orange, CA (*Abstract Co-Author*) Nothing to Disclose
Hina Arif, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

salbayati@radiology.arizona.edu

TEACHING POINTS

-Illustrate characteristic MR imaging approach for Todani classification of bile duct cysts. -To utilize different MR imaging sequences to diagnose choledochal cyst complications.

TABLE OF CONTENTS/OUTLINE

• Background• Incidence and Clinical Presentation• Imaging characteristics according to Modified Todani Classification System• Choledochal Cyst Complications: • Cholangitis• Pancreatitis• Stones• Malignancy• Summary • References

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES — TOGETHER

GI235-ED-X

An In-Depth Review of MRI Features of Treated Hepatocellular Carcinoma (HCC) Following Stereotactic Body Radiation Therapy (SBRT), Transarterial Chemoembolization (TACE), and Selective Internal Radiation Therapy (SIRT) with Ytrrium-90

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Identified for RadioGraphics

Participants
Mohanned Alnammi, MD, Burlington, MA (*Presenter*) Nothing to Disclose
Agnieszka Witkowska, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Jalil Afnan, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Jaclyn A. Therrien, DO, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Agnieszka.Witkowska@Lahey.org

TEACHING POINTS

A pictorial review and comparison of magnetic resonance(MR) imaging features of treatment response for Hepatocellular Carcinoma(HCC) by Stereotactic Body Radiation Therapy (SBRT), Transarterial Chemoembolization (TACE) or Yttrium-90 Radioembolization (SIRT). This is to highlight the emerging importance of imaging in assessment of treatment response to different loco-regional therapy with focus on various response patterns and pitfalls.

TABLE OF CONTENTS/OUTLINE

1) Review the post-SBRT imaging features in a longitudinal series with treated HCC evolution over time in the acute(1-3 months), sub-acute (3-6 months) and chronic (6 or more months) and common pitfalls of early imaging. 2) Review of patient selection for Ytrrium-90 therapy including preprocedural Mesenteric Angiogram and Liver Perfusion Scintigraphy for evaluation of shunt fraction to the pulmonary bed with review of post treatment imaging patterns. 3)Review of classical features of post treated HCC responce to Tranarterial Chemoembolization(TACE).

GI236-ED-X

Low Energy Electromagnetic Fields with Amplitude Modulation: Systemic Antitumoral Effects in Advanced Hepatocellular Carcinoma (HCC)

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Gabriela R. Camerin, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Regis Otaviano Bezerra, MD, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Irai S. Oliveira, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Leonardo d. Testagrossa, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Giovanni G. Cerri, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Frederico Costa, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

gabicamerin@gmail.com

TEACHING POINTS

To understand the current concepts and treatments of advanced hepatocellular carcinoma (HCC).To explore liver anatomy, anatomical relationships and vascularization.To explain the concepts of low energy electromagnetic fields (LEEF) with amplitude modulation in cancer treatment.To describe cells changes observed after exposure to LEEF using ultrastructure microscopyTo understand imaging response patters after exposure to LEEFTo explain the intended impacts of this technique.

TABLE OF CONTENTS/OUTLINE

INTRODUCTIONFeatures of advanced hepatocellular carcinoma (HCC).ANATOMICAL CONCEPTSLiver relationships in abdomen and vascularization.EPIDEMIOLOGY AND PROGNOSTICCURRENT MANAGEMENT OF ADVANCED HCCSorafenib cellular impacts/indications.DETALING LEEF TECHNIQUEUse of AUTEM system to search cancer-specific frequencies: a patient-based approach.The radiofrequency generator exposure: procedure descriptionPOSSIBLE EFFECTS OF ELETROMAGNETIC FIELDS IN ADVANCED HCCChanges in mitochondrial ion kinetics Autonomic regulation changes with parasympathetic response.Transmembrane proteins structure alteration.Energy transference through microtubules INTERACTIVE CASE-BASED DIDACTICSSample MRI and CT cases to illustrate response patterns based on RECIST criteriaFUTURE DIRECTIONSValidation of these data in a phase II randomized trial

GI237-ED-X

Radiology After Hours: CT Diagnosis of Acute Small Bowel Pathologies

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Kheng L. Lim, MD, Bala Cynwyd, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Kheng.Lim@pennmedicine.upenn.edu

TEACHING POINTS

Computed Tomography (CT) imaging is the default workhorse in the initial evaluation of acute processes in the abdomen and pelvis. As such, radiologists are in a unique position to add value to the care of patients. The purpose of this exhibit is: To review the various presentation of patients with acute small bowel pathologies. To discuss the imaging findings that lead to accurate and timely diagnosis of small bowel pathologies. To present ways radiologists can enhance their roles in the care of patients as they journey through the health system.

TABLE OF CONTENTS/OUTLINE

In this exhibit, we present common and uncommon etiologies of acute small bowel pathology, as well as pearls and pitfalls of arriving at a diagnosis. We present real cases following the patient through the healthcare system, imaging diagnosis with correlation to laboratory data (where applicable) and illustrate ways of achieving accurate diagnosis and avoiding errors. Teaching points highlighting the importance of utilization of electronic medical records are presented. Brief overview of embryology of small bowel, normal and variant anatomy are presented. Cases showing acute small bowel pathology include congenital, infectious, inflammatory, traumatic and neoplastic etiologies.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI238-ED-X

MR Images Findings of Anal Carcinoma

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Karina K. Zoghbi, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Kamila S. Albuquerque, Vila Velha, Brazil (*Abstract Co-Author*) Nothing to Disclose
Douglas J. Racy, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Maria Helena N. Pedroso, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Graziela C. Oliveira, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Marilia P. Ferreira, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Jose d. Fernandes Sr, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Marcela C. Leite I, MS, Barueri, Brazil (*Abstract Co-Author*) Nothing to Disclose
Bruna B. Libanio, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Larissa R. Favaro, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Marcos V. Lauar Filho, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Carolina P. Abud, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

karinazoghbi13@hotmail.com

TEACHING POINTS

- Define the main radiological characteristics of anal canal cancer. - Currently, imaging methods have an important impact on the treatment of patients and play a key role in primary staging and post-treatment follow-up. - Adequate description of the characteristics of the lesion is important because the correct staging directly influences the treatment and the good therapeutic response.

TABLE OF CONTENTS/OUTLINE

Anal canal neoplasms are always a diagnostic challenge in relation to their description in view of the complex anatomy of the study site, this work has as objective the best understanding of the sphincter complex to enable an adequate description of the lesion. Radiologists should understand the main radiological characteristics of anal canal cancer with this knowledge, accurately report the local-regional extension of the tumor, with special attention to the sphincter complex and the lymph nodes involved.

GI239-ED-X

Imaging of Pancreatic Neuroendocrine Neoplasms: What Radiologists Should Know

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Akihiko Kanki, MD, Kurasiki, Japan (*Presenter*) Nothing to Disclose
Tsutomu Tamada, MD,PhD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Hidemitsu Sotozono, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazuya Yasokawa, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Akira Yamamoto, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

The purpose of this presentation is: 1) To demonstrate the common and uncommon computed tomography (CT) and magnetic resonance (MR) imaging findings of pancreatic neuroendocrine neoplasms, including the radiologic-pathologic correlation. 2) To learn the pancreatic disorders that can mimic pancreatic neuroendocrine neoplasms

TABLE OF CONTENTS/OUTLINE

Classification/Grade of pancreatic neuroendocrine neoplasia (WHO 2017) Imaging findings of common pancreatic neuroendocrine neoplasms - Well-differentiated pancreatic neuroendocrine tumor (PanNET G1-G3) - Poorly differentiated pancreatic neuroendocrine carcinoma (PanNEC) Imaging findings of uncommon pancreatic neuroendocrine tumors - Non-hypervascular tumors - Tumors with pancreatic duct obstruction (serotonin-producing NETs) - Tumors with cystic change - Tumors with exophytic growth Pancreatic disorders that can mimic common and uncommon pancreatic neuroendocrine neoplasms Common pancreatic neuroendocrine neoplasms - Pancreatic hypervascular metastasis - Acinar cell carcinoma - Serous cystic neoplasm (solid variant) - Intrapancreatic accessory spleen Uncommon pancreatic neuroendocrine neoplasms - Pancreatic ductal adenocarcinoma - Pancreatic cystic neoplasms - Various pancreatic tumors with cystic degeneration

GI240-ED-X

A Hard-to-Swallow Tale: CT Imaging of Fish Bone Ingestion Complications

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Gabriella S. Silva, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Giuseppe D'ippolito, MD, PhD, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Ulysses S. Torres, MD, PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Natalia B. Gomes, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Rafael B. Nunes, MD, Belem, Brazil (*Abstract Co-Author*) Nothing to Disclose
Humberto L. McPhee, MD, Belem, Brazil (*Abstract Co-Author*) Nothing to Disclose
Eduardo O. Pacheco, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Matheus M. Gomes SR, MD , Recife, Brazil (*Abstract Co-Author*) Nothing to Disclose
Anderson G. Azzolini, MD, Curitiba, Brazil (*Abstract Co-Author*) Nothing to Disclose
Flavio Murilo R. Bezerra, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Pedro Luiz S. Coelho, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

gabriellasouzaes@gmail.com

TEACHING POINTS

· Fish is one of the most consumed food in many communities around the world which have extensive river system or proximity to the sea. · Fish bone is the most common foreign body accidentally ingested and complications are seen in less than 1% of the cases, ranging from mild inflammatory changes to gastrointestinal tract perforation, abscess formation, viscus involvement and mycotic aneurysm development. · As fish bone perforation of the gastrointestinal tract has a wide spectrum of clinical presentations (ranging from acute to chronic) and the ingestion is poorly related/ remembered by the patients, the radiologist plays an essential role in the clinical suspicion and diagnosis. · CT scan is considered the best diagnostic modality as fish bone is commonly a low radiopaque foreign body.

TABLE OF CONTENTS/OUTLINE

· Epidemiologic data about fish bone ingestion complications. · Case-based review illustrating the CT findings of different fish bone ingestion-related complications. · Take-home messages. · References.

GI241-ED-X

Current Concepts in Angiogenesis in Solid Tumors: Pathophysiology, Targeted Therapy, and Complications with Multi-Modality Imaging Patterns

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Ahmed Wagih Mohamed Saber Moawad, MBBS, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Katherine J. Blair, MD, Houston, TX (*Presenter*) Nothing to Disclose
Akram M. Shaaban, MBBCh, Salt Lake City, UT (*Abstract Co-Author*) Contributor, Reed Elsevier; Author, Reed Elsevier
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Chandana G. Lall, MD, Orange, CA (*Abstract Co-Author*) Nothing to Disclose
Ajaykumar C. Morani, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Janio Szklaruk, MD, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Khaled M. Elsayes, MD, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

kmelsayes@mdanderson.org

TEACHING POINTS

1. Introduce basic concepts of angiogenesis in the oncogenesis. 2. Discuss the role of angiogenesis in tumor progression and spread 3. Illustrating the Imaging features of angiogenesis using various modalities 4. State the general indications of anti-angiogenic therapy in solid tumors 5. Monitoring therapy using various imaging techniques 6. Discuss the effect of antiangiogenic therapy on tumor and its adverse effects.

TABLE OF CONTENTS/OUTLINE

1) Basics of Angiogenesis 2) Pathogenesis of tumor induced angiogenesis 3) Factors responsible for tumor induced angiogenesis 4) Imaging of angiogenesis: a) Ultra-sonography (US) and contrast enhanced US b) Dynamic cross-sectional imaging c) Digital subtraction angiography 5) Role of neo-angiogenesis in metastasis 6) Anti-angiogenesis dmedication a) Basic principles b) General indications in different solid tumors 7) Methods of monitoring treatment with anti-angiogenic therapy: a) RECIST & Modified RECIST b) CT Perfusion Scan c) Diffusion weighted imaging (DWI) and MRI perfusion scan 8) Response to anti-angiogenic therapy: 9) Adverse effects of anti-angiogenic therapy: a) General & specific complications b) Adverse effects (portal vein thrombosis, pseudo-cirrhosis, and intra-tumoral bleeding)

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI242-ED-X

Diseases of the Pancreas and the Biliary Tract: Close Locations and Similar Presentations

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Caroline C. Santiago, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Liege T. Gomes, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Brunna Oliveira, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Rodrigo P. Polizio, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Cinthia D. Ortega, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Speaker, Johnson & Johnson
Irai S. Oliveira, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

carol.caldfaria@gmail.com

TEACHING POINTS

The purpose of this exhibit is: 1. To discuss the embryological origin of pancreatic and biliary tissues. 2. To link embryology origin to different pancreatic and biliary diseases. 3. To illustrate these aspects with imaging findings.

TABLE OF CONTENTS/OUTLINE

1. Embryological origin of pancreatic and biliary tissues. 2. Clinical aspects and histology of pancreatic and biliary diseases 3. Imaging aspects of: - Autoimmune pancreatitis x autoimmune cholangitis; - Pancreatic adenocarcinoma x extrahepatic cholangiocarcinoma; - Pancreatic intraductal papillary mucinous neoplasm x intraductal papillary mucinous neoplasm of the billiary tract; - Mucinous cystic neoplasm of the pancreas x Mucinous cystic neoplasm of the liver.

Printed on: 10/29/20

GI243-ED-X

Many Faces of Lymphoma: Abdominal Manifestations of Extranodal Lymphoma

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Mariya Kobi, MD, Bronx, NY (*Presenter*) Nothing to Disclose
Zina J. Ricci, MD, Scarsdale, NY (*Abstract Co-Author*) Nothing to Disclose
Devaraju Kanmaniraja, MD, Bronx, NY (*Abstract Co-Author*) Nothing to Disclose
Victoria Chernyak, MD,MS, Bronx, NY (*Abstract Co-Author*) Consultant, Bayer AG

For information about this presentation, contact:

mariya.kobi@gmail.com

TEACHING POINTS

To familiarize the reader with various abdominal organs involved in extranodal lymphoma in both immune competent and immunocompromised individuals To review variable imaging appearances of lymphoma in each organ

TABLE OF CONTENTS/OUTLINE

Solid Abdominal Organs Liver Gall Bladder Spleen Pancreas Adrenal Gastrointestinal Tract Gastric Small Bowel Large Bowel Rectum Genitourniary System Renal Urinary Bladder Testicular Ovarian Misc Peritoneal Soft tissue

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES — TOGETHER

GI244-ED-X

Role of MR Imaging in Accurate Diagnosis of Primary Peritoneal Serous Carcinoma

All Day Room: GI Community, Learning Center Digital Education Exhibit

FDA Discussions may include off-label uses.

Participants
Shahad Al Bayati, MD, Tucson, AZ (*Presenter*) Nothing to Disclose
Bobby T. Kalb, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
James B. Sowby, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Dheeraj Reddy Gopireddy, MD, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Neeraj Lalwani, MD, Winston Salem, NC (*Abstract Co-Author*) Nothing to Disclose
Chandana G. Lall, MD, Orange, CA (*Abstract Co-Author*) Nothing to Disclose
Hina Arif, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

salbayati@radiology.arizona.edu

TEACHING POINTS

1. Primary peritoneal serous carcinoma (PPSC) is an ovarian epithelial malignancy that arises from extra-ovarian mesothelium with Mullerian potential.2. PPSC can be a difficult diagnosis to make. Imaging features at CT are subtle/nonspecific, and histology is indistinguishable from metastatic ovarian carcinoma. 3. Common imaging mimics of PPSC include ovarian cancer, peritoneal carcinomatosis4. Review of traditional clinical method of diagnosis of PPSC, based on the Gynecology Oncology Group criteria 5. MRI allows for accurate diagnosis due to its high sensitivity for detecting peritoneal disease and its high specificity in excluding an intra-abdominal primary lesion.6. Features of PPSC on MRI include enhancing peritoneal, retroperitoneal, and omental nodules, as well as ascites.

TABLE OF CONTENTS/OUTLINE

1. Background: demographics, pathology, and natural history of PPSC.2. Gynecology Oncology Group (GOG) criteria used for diagnosis and treatment planning PPSC3. Diagnostic imaging features for PPSC.4. Example cases, demonstrating the following:a. Difficulty of detecting peritoneal disease at CT.b. Increased sensitivity of MRI for PPSC lesions.c. Ability to evaluate for ovarian or other intra-abdominal primary malignancy at MRI.5. Conclusions/recommendations.

GI245-ED-X

Catch the Move: Esophageal Disease in Barium Swallow

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Dulce A. Sanchez Nava, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose
Monica Munoz-Lopez, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Denny Lara Nunez, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Aldo E. Lara Reyes, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

dulce.adoracion.sanchez@gmail.com

TEACHING POINTS

Describe the imaging findings in esophagography of structural and motility disorders.Discuss the clinical and key radiologic differential findings in barium swallow of each esophageal pathology.

TABLE OF CONTENTS/OUTLINE

The cases will be presented in a quiz format. Key clinical and radiological findings and differential diagnosis will be discussed in every case.The list include- Motility disorders (primary and secondary achalasia , diffuse esophageal spasm, secondary esophageal motility disorders)- Esophageal diverticulum (traction and pulsion)- Esophagitis

GI246-ED-X

Challenges in Diagnosis and Management of Hemobilia

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Ahmad Parvinian, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Joel G. Fletcher, MD, Rochester, MN (*Abstract Co-Author*) Grant, Siemens AG; Consultant, Medtronic plc; Consultant, Takeda Pharmaceutical Company Limited; Grant, Takeda Pharmaceutical Company Limited; ;
Andrew Storm, MD, Rochester, MN (*Abstract Co-Author*) Research support, Boston Scientific Corporation; Research support, Apollo Endosurgery; Consultant, GI Dynamics; Consultant, EndoTAGSS;
Sudhakar K. Venkatesh, MD, FRCR, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Jeff L. Fidler, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Ashish R. Khandelwal, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

khandelwal.ashish@mayo.edu

TEACHING POINTS

Increasing arsenal of hepatobiliary interventions has resulted in an increased incidence of hemobilia, which is still an uncommon cause of upper GI bleed. This exhibit will • Review the imaging manifestations of hemobilia on CT and MRI with correlating angiographic or endoscopic management. • The learner will be able to understand the central role of imaging and intervention in case-based approach.

TABLE OF CONTENTS/OUTLINE

• Background- Hemobilia is a potentially life-threatening cause of upper gastrointestinal hemorrhage caused most often by hepatic trauma or iatrogenic injury • Learn about different causes of hemobilia including malignancy, cholecystitis, portal biliopathy, and hemosuccus pancreaticus. • CT angiography and endoscopy/ERCP have become common initial diagnostic testing modalities due to their versatility in excluding other causes of bleeding. • Common imaging features suggesting hemobilia include -hematocele formation at the site of intervention, - pseudoaneurysm o arterio-biliary fistulas - extravasation of contrast • Transarterial embolization remains the mainstay therapy in significant hemobilia. However, vascular stenting or biliary duct stenting can be a promising alternative.

GI247-ED-X

Not So Incidental: When Intra-Abdominal Malignancies Calcify

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Zaid Haddadin, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Shaden F. Mohammad, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Anokh Pahwa, MD, Santa Monica, CA (*Abstract Co-Author*) Nothing to Disclose
Monica Deshmukh, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Lori Mankowski Gettle, MD , Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Barbara M. Kadell, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Maitraya K. Patel, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Zaid.M.Haddadin@gmail.com

TEACHING POINTS

The presence of calcium deposits within abdominal masses is common. These tumors can develop calcifications de novo, or after treatment. The goal of this exhibit is to present a spectrum of calcified abdominal malignancies on computed tomography which can allow the radiologist to provide a more specific differential diagnosis based on pattern of calcification and organ of origin.

TABLE OF CONTENTS/OUTLINE

1) Describe the various patterns of intratumoral calcification. 2) Present a system of classification of calcified abdominal masses based on organ. 3) Present a case-based review of the various malignant neoplastic causes of calcification in the abdomen and pelvis, covering the unique patterns of calcium deposition, associated prognostic significance and differential diagnosis for each of the following diseases: Fibrolamellar Carcinoma, Colorectal Metastasis (Liver), Pancreatic Neuroendocrine Tumor, Acinar Cell Carcinoma, Pancreatic Mucinous Cystic Neoplasm, Renal Cell Carcinoma, Transitional Cell Carcinoma, Carcinoid, Gastrointestinal Stromal Tumor, Pseudomyxoma Peritonei, Ovarian metastasis (Peritoneum), Dermoid, and Lymphoma.

Printed on: 10/29/20

GI248-ED-X

Hydrotomography for Local Assessment of Esophageal Cancer

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Sebastian A. Rossini SR, Mar del Plata, Argentina (*Presenter*) Educational Exhibit, Bayer AG; Educational Exhibit, Boehringer Ingelheim GmbH
Javier Perez, Mar del Plata, Argentina (*Abstract Co-Author*) Nothing to Disclose
Nicolas Nieto, Mar del Plata , Argentina (*Abstract Co-Author*) Nothing to Disclose
Florencia Nielsen, Mar del Plata , Argentina (*Abstract Co-Author*) Nothing to Disclose
Carlos A. Capiel, MD, Mar del Plata, Argentina (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

sebastianrossini@iradiologico.com.ar

TEACHING POINTS

Describe a new technique to obtain a correct esophageal distention with fluid during a tomography. Emphasize the advantages of hydrotomography over pneumotomography Show representative cases of different esophageal tumor stages with this technique

TABLE OF CONTENTS/OUTLINE

Esophageal cancer is a relatively uncommon gastrointestinal malignancy but carries a poor prognosis unless it is of early stage and can be surgically resected for cure.The correct staging allows an adequate management of these patients. Echoendoscopy is the technique of choice for local staging. But during a tomography with intravenous contrast, a correct distension of the esophagus with water will allow us to perform a correct local evaluation of the tumor. We describe an easy technique that allows paralysis of the esophagus during tomographic acquisition.

GI249-ED-X

Beyond Rectal Cancer: Spectrum of Imaging Features for Perirectal Tumors and Tumor-Like Masses with Pathologic Correlation

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Cum Laude

Participants
Ayman H. Gaballah, MD, FRCR, Columbia, MO (*Abstract Co-Author*) Nothing to Disclose
Ahmed H. Abdelrahman, MD, Columbia, MO (*Presenter*) Nothing to Disclose
Aws S. Hamid, MD, Columbia, MO (*Abstract Co-Author*) Nothing to Disclose
Amr S. Abdelaziz, MD, Columbia, MO (*Abstract Co-Author*) Nothing to Disclose
Nanda Deepa Thimmappa, MD, Columbia, MO (*Abstract Co-Author*) Nothing to Disclose
Akram M. Shaaban, MBBCh, Salt Lake City, UT (*Abstract Co-Author*) Contributor, Reed Elsevier; Author, Reed Elsevier
Amr Shabana, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Khaled M. Elsayes, MD, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

gaballaha@health.missouri.edu

TEACHING POINTS

Illustrate anatomy of perirectal spaces Discuss the utility of cross sectional imaging modalities in detection, diagnosis and differential diagnosis of perirectal tumors and tumor-like masses Describe management options for these lesions

TABLE OF CONTENTS/OUTLINE

Introduction Perirectal spaces anatomy and landmarks Imaging features and differential considerations of perirectal tumors and tumor-like masses Case presentation Impact of imaging findings on management

GI250-ED-X

Rectal and Perirectal Conditions: To Rectal Adenocarcinoma... and Beyond!

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Jose Miguel Escudero-Fernandez, MD, Barcelona, Spain (*Presenter*) Nothing to Disclose
David Armario, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Ema Andra Moraru, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Alba Anton-Jimenez, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Marta Vera Cartas, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Marina Conangla-Planes, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Marta Gonzalo Carballes, BMBCh, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Miguel A. Rios-Vives, MD , Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Xavier Merino-Casabiel, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jmescudero4@gmail.com

TEACHING POINTS

Rectum and perirectal space can be affected by a wide variety of tumors and tumor-like conditions, which may present with similar symptoms similar to those of rectal adenocarcinoma. Tumors of the rectum are mostly neoplastic, symptomatic and malignant, whereas tumors of the perirectal space are most commonly congenital, asymptomatic and benign. - To provide a comprehensive review of anatomical landmarks of rectal and perirectal region - To revise common and uncommon rectal and perirectal conditions, including tumor and tumor-like conditions - To highlight the imaging clues for their accurate diagnosis

TABLE OF CONTENTS/OUTLINE

• Anatomical landmarks of perirectal space • MRI protocol • Rectal wall - Mucosa Adenocarcinoma: TNM, post neoadjuvant chemotherapy, post-surgical complications and diagnostic of recurrence Other tumors: lymphoma, anorectal melanoma Inflammatory: proctitis - Submucosal: metastases, neuroendocrine tumor, GIST, lipoma, leiomioma, hemangioma, endometriosis, • Perirectal Developmental cysts: epidermoid, dermoid, duplication and tailgut cysts Imflammatory: abscess and fistulae Tumors: sacrococcygeal teratoma, neurofibroma, chordoma, liposarcoma, mielolipoma, myxoma, benigncystmesothelioma Extramedullary hematopoiesis • Table with key imaging features for differential diagnosis

GI251-ED-X

MRI Enterography: Revisiting a Potential, Novel, Radiation Free Technique to Image Bowel Pathologies - Highlights and Tricks to Make the Technique Patient and Radiologist Friendly

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Mitusha Verma, MBBS, Mumbai, India (*Presenter*) Nothing to Disclose
Palak Thakrar, Mumbai, India (*Abstract Co-Author*) Nothing to Disclose
Deepak Patkar, MD, Mumbai, India (*Abstract Co-Author*) Nothing to Disclose
Sushen K. Kondapavuluri, MD,MBBS, Tadepalli, India (*Abstract Co-Author*) Nothing to Disclose
Pranav C. Thombare, DMRD,MBBS, Mumbai, India (*Abstract Co-Author*) Nothing to Disclose
Yogini N. Sawant, MBBS, Mumbai, India (*Abstract Co-Author*) Nothing to Disclose
Jignesh G. Thakker, Thane, India (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

drmitusha@gmail.com

TEACHING POINTS

To understand MR enterography technique To compare CT enterography versus MRI enterography To compare MRI enterography versus MRI enteroclysis Understanding the various MRI features in inflammatory bowel disease Understanding imaging features to predict activity in inflammatory bowel disease To review utility of MRI enterography in bowel pathologies beyond inflammatory bowel disease To understand small tricks to make the technique patient and scanner friendly To understand the advantages and disadvantages as well as limitation of MRI enterography.

TABLE OF CONTENTS/OUTLINE

Introduction MRI enterography : current indications and guidelines MRI enterography : Understanding the intricacies of the technique MRI versus CT enterography MRI enterography versus MRI enteroclysis : Do you really need the patient to suffer Imaging features in active and inactive inflammatory bowel disease Imaging features in intestinal tuberculosis Imaging features in small bowel malignancies Imaging features in bowel motility disorders Pearls and pitfalls of MRI enterography Future Directions Conclusion

GI252-ED-X

Ultrasonographic Atlas of Splenic Lesions

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Kyeong Ah Kim, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Yang Shin Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jongmee Lee, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jae Woong Choi, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Mi Jin Song, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Chang Hee Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

In comparison with other solid abdominal organs, the spleen is relatively rarely the primary site affected by disease. By contrast to the widely studied lesions of the liver, the US appearance of disease in the spleen is rather nonspecific. An understanding of the history and associated symptoms may help narrow the differential diagnosis. 1. To understand fundamentals of splenic ultrasonography. 2. To illustrate key imaging findings of splenic abnormalities in ultrasonography.

TABLE OF CONTENTS/OUTLINE

I. Introduction II. Fundamentals of spleen imaging: special focus on US III. Ultrasonic features of various splenic lesions : 1. Anomalies and anatomic variants (wandering or ectopic spleen, accessory spleen) 2. Nonneoplastic diseases (splenomegaly, Gamna-Gandy Bodies, infarction, cystic lesions, peliosis) 3. Infection and inflammatory diseases (pyogenic abscess, fungal abscess, tuberculosis, sarcoidosis) 4. Benign neoplasms (hemangioma, lymphangioma, hamartoma, sclerosing angiomatoid nodular transformation, inflammatory pseudotumor) 5. Malignant neoplasms (lymphoma, angiosarcoma, metastatic tumors), based on gray-scale and color Doppler sonography.

GI253-ED-X

Practical Approaches and Updated Topics in Gadoxetate-Enhanced MR Imaging of the Liver: What the Radiologists Should Know

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Atsushi Higaki, MD, Kurashiki, Japan (*Presenter*) Nothing to Disclose
Tsutomu Tamada, MD,PhD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Akihiko Kanki, MD, Kurasiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazuya Yasokawa, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Akira Yamamoto, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ahah@med.kawasaki-m.ac.jp

TEACHING POINTS

The purpose of this presentation is: 1) To understand the pharmacologic characteristics of gadoxetate disodium 2) To demonstrate the optimal protocol of gadoxetate-MRI 3) To illustrate pitfalls and recent topics of gadoxetate-MRI

TABLE OF CONTENTS/OUTLINE

Pharmacologic characteristics · Pharmacokinetics · Comparison with Gd-DTPA and Gd-BOPTA · Uptake and excretion transporters · Degree of tissue deposition of gadoxetate disodium Optimal protocol · Optimization of MRI protocol · Idea to shorten examination time and reduce artifacts Practical Approaches · Diagnostic performance of Liver Tumors · Typical imaging findings reflecting multistep hepatocarcinogenesis · Hepatobiliary phase (HBP) hypointense nodule without arterial phase hyper-enhancement (high risk nodule) · HBP hyperintense nodule · Evaluation of liver function and liver fibrosis Pitfalls & Recent clinical trials · Early enhancing lesions showing hypointensity on HBP mimicking hypervascular HCC · Characteristics of HCC development after HCV eradication by direct-acting antivirals · Imaging findings in molecular classification of HCC · Attention points when evaluating LI-RADS (Liver Imaging Reporting and Data System) features using gadoxetate-MRI · Diagnostic performance of LI-RADS with gadoxetate-MRI for HCC · Radiomics on gadoxetate-MRI for HCC management

GI254-ED-X

Computed Tomography Opportunistic Use: What are We Missing?

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Laura M. Coura, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Caio H. Nascif, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Natalia K. Fujiwara, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Liege T. Gomes, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Romulo H. do Vale, MD, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Irai S. Oliveira, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Cinthia D. Ortega, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Speaker, Johnson & Johnson
Hilton M. Leao Filho, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Serli Ueda, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

laura.mcoura@gmail.com

TEACHING POINTS

The wide use of CT scans in clinical practice has generated large amounts of data which is not always directly related to the original clinical question and may have important prognostic implications for patient management. Unenhanced CT is an objective and noninvasive method that can provide means for numerous pathologic conditions detection in asymptomatic patients as such: Liver: fat and iron deposition, as well as surface nodularity quantification. Cardiovascular risk has related to abdominal aorta calcifications, another information that is easily accessed in CT scans. Also, information related to sarcopenia and bone density can be obtained and used in patients management. In this review, we aim to call our fellow radiologist's attention to some simple parameters that can be assessed during a low dose nonenhanced CT that may aid in establishing cardiovascular risk, diagnosing metabolic syndrome, and, more importantly, have a potential of altering patients outcomes.

TABLE OF CONTENTS/OUTLINE

Current concepts of opportunistic use of CT. Assessment of abdominal aortic calcification and its impact on cardiovascular risk assessment. Detection and quantification of liver fat and iron deposition. Visceral fat measurement correlation with metabolic syndrome. Future developments and opportunistic use of MRI.

GI255-ED-X

Benign Esophageal and Gastric Tumors: The Role of the Radiologist

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Beatriz Consola, MD, Sabadell, Spain (*Presenter*) Nothing to Disclose
Marta Sola, MD, Sabadell, Spain (*Abstract Co-Author*) Nothing to Disclose
Amalia Gonzalez Lopez, Sabadell, Spain (*Abstract Co-Author*) Nothing to Disclose
Maria Jose d. Prieto, MD, Sabadell , Spain (*Abstract Co-Author*) Nothing to Disclose
Antoni Malet-Munte, MD, Sabadell, Spain (*Abstract Co-Author*) Nothing to Disclose
Francesc Novell Teixido, MD, Sabadell, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

bconsola@hotmail.com

TEACHING POINTS

The purpose of this exhibit is: 1. To review the clinical, epidemiological features and the more commonly used classifications of benign tumors of the esophagus and stomach. 2. To explain the usefulness of the different types of medical imaging techniques in the diagnosis. 3. To review the imaging findings that can help in the diagnosis of esophageal and gastric benign neoplasms and tumor-like conditions.

TABLE OF CONTENTS/OUTLINE

1. Introduction. 2. Clinical and epidemiological characteristics. 3. Classification. 4. Role of the radiologist. 5. Pictorial review of benign esophageal and gastric tumors. 6. Treatment considerations. 7. Conclusion.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI256-ED-X

Clinical Application of Noninvasive Functional Imaging Using Non-Contrast Enhanced MR Imaging with a Spatially Selective Inversion Recovery Pulse

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Akira Yamamoto, MD, Kurashiki, Japan (*Presenter*) Nothing to Disclose
Kazuya Yasokawa, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Akihiko Kanki, MD, Kurasiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Takeshi Fukunaga, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Hidemitsu Sotozono, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Atsushi Higaki, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Katsuyoshi Ito, MD, Ube, Japan (*Abstract Co-Author*) Nothing to Disclose
Tsutomu Tamada, MD,PhD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jiro@med.kawasaki-m.ac.jp

TEACHING POINTS

1. To understand the technique of functional MR imaging using a spatially selective inversion recovery (ssIR) pulse. 2. To demonstrate the clinical trials on pancreatic exocrine function with evaluation of flow of pancreatic juice and bile using cine dynamic MRCP with ssIR pulse 3. To demonstrate the clinical trials on renal function with measurement of cortical thickness using steady state free precession (SSFP) imaging with ssIR pulse

TABLE OF CONTENTS/OUTLINE

Technique of functional MR imaging using ssIR pulse - Various MR imaging using ssIR pulse - Techniques of cine dynamic MRCP with ssIR pulse for evaluating flow of pancreatic juice and bile - Techniques of SSFP imaging with ssIR pulse for evaluating cortical thickness To demonstrate the pancreatic exocrine function using cine dynamic MRCP with ssIR pulse - Age related change in flow of pancreatic juice - Postprandial changes in flow of pancreatic juice and bile - Assessment of pancreatic exocrine function - Assessment of the severity of chronic pancreatitis - Change in bile flow after cholecystectomy To demonstrate the renal function using SSFP imaging with ssIR pulse - Age-related change of renal cortical thickness - Relationship between the renal cortical thickness and renal function - Difference of renal function between patients with and without cirrhosis

GI257-ED-X

What Could Go Wrong? Pitfalls and Practical Tips in Assessing the Post-Operative Pancreas Transplant

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Ozair A. Rahman, MBBS, New York, NY (*Presenter*) Nothing to Disclose
Ryan P. Mitchell, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Lyndon Luk, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

oar9003@nyp.org

TEACHING POINTS

Selection Criteria Age Disease History Hemodialysis status Surgical Technique Historical technique, and recent advances Current surgical approach and illustrations of bowel and vascular anastamoses Radiology Ultrasound, MRI and CT Clinical utility of each modality and its current application

TABLE OF CONTENTS/OUTLINE

Background The first whole pancreas transplant was performed in 1966 at the University of Minnesota, more than 23,000 transplant have been reported since, with a steady increase over the last decade. Complications An increasing number of simultaneous pancreas-kidney (SPK) transplants are being performed with an acute rejection rate of 7-25% and chronic rejection rate of 2-23%. Multiple imaging modalities have been employed in accurately diagnosing complications including; vascular thrombosis, post transplant pancreatitis, or enteric complications of which anastomotic leak or bowel obstruction being the most common. Purpose The purpose of this educational exhibit is to briefly describe SPK transplantation including the current surgical technique, and highlight the role Ultrasound, Magnetic Resonance Imaging and Computed Tomography plays in directing post operative management.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI258-ED-X

Systemic Treatment Strategy in Management of Hepatocellular Carcinoma: Implications for Radiologist

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Amir Ata Rahnemai Azar, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Ezgi Guler, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Ahmad Hashmi, Cleveland , OH (*Abstract Co-Author*) Nothing to Disclose
Sreeharsha Tirumani, MBBS, MD, Beachwood, OH (*Abstract Co-Author*) Nothing to Disclose
Nikhil H. Ramaiya, MD, Shaker Heights, OH (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

amir.azar@uhhospitals.org

TEACHING POINTS

Introduction of novel systemic treatments leaded to rapid change in management of the previously considered decimal hepatocellular carcinoma (HCC). It is estimated that eventually more than 50% of HCC patients will need systemic treatments. Imaging plays a pivotal role in surveillance, diagnosis and follow up of patients with HCC. In contrast to locoregional treatments however, imaging characteristics of systemic treatments (response and complications) are less known. The aim of this exhibit is to review the brief mechanism, indications, complications (with specific focus on imaging findings) as well as different imaging criteria for evaluation of treatment response of currently FDA approved HCC systemic treatments.

TABLE OF CONTENTS/OUTLINE

Overview of HCC systemic treatments and current FDA approved medication. Sorafenib and Levatinib: mechanism, efficacy, complications, representative images for complications Regorafenib and Nivolumab: mechanism, efficacy, complications, representative images for complications Pembrolizumab mechanism, efficacy, complications, representative for complications. Overview of Imaging response, representative images for response to treatment, overview of RECIST, mRECIST and iRECIST criteria with their applications and specific limitations.

Printed on: 10/29/20

GI259-ED-X

Primary Retroperitoneal Masses with Radiologic-Pathologic Correlation: What Radiologists Should Know

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Adriano Basso Dias, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Julia A. Miranda, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Pedro Panizza, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Tiago Miranda Dias, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Alexandre M. Pereira, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Publio C. Viana, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Claudia D. Leite, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Giovanni G. Cerri, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Natally Horvat, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

adrianobassodias@gmail.com

TEACHING POINTS

- Understand the retroperitoneal anatomy - Comprehend how to categorize an intra-abdominal mass as a primary retroperitoneal mass - Know how to narrow the differential diagnosis of the primary retroperitoneal masses based on the key imaging features

TABLE OF CONTENTS/OUTLINE

INTRODUCTION - Definition and epidemiology of primary retroperitoneal masses ANATOMICAL CONCEPTS - Key anatomical landmarks of the retroperitoneum demonstrated by illustrations with imaging correlation IMAGING INTERPRETATION - Systematic approach to categorize an intra-abdominal mass as a primary retroperitoneal mass - Classification of the primary retroperitoneal masses based on the embryologic origin (mesodermal, neurogenic, germ cell and lymphoid lesions) - A pictorial review of the main retroperitoneal lesions with radiologic-pathologic correlation - Tips for the diagnosis of retroperitoneal masses based on the tissue composition (fat, soft tissue or cystic), vascularization (hyper or hypovascular) and pattern of growth (paravertebral and mantle growth)

Printed on: 10/29/20

GI260-ED-X

Portal Vein Potpourri: From Thrombosis to Therapy

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Akram Sadeghi, MD, Morristown, NJ (*Presenter*) Nothing to Disclose
Derrick T. Tran, MD, Edmond, OK (*Abstract Co-Author*) Nothing to Disclose
William B. Vanlandingham, MD, Oklahoma City, OK (*Abstract Co-Author*) Nothing to Disclose
Sean K. Calhoun, DO, Long Valley, NJ (*Abstract Co-Author*) Nothing to Disclose
Keri Conner, DO, Oklahoma City, OK (*Abstract Co-Author*) Nothing to Disclose
Thaddeus M. Yablonsky, MD, Morristown, NJ (*Abstract Co-Author*) Nothing to Disclose
Shadi Saleem, MD, Oklahoma City, OK (*Abstract Co-Author*) Nothing to Disclose
Jooman Shim, MD, Little Silver, NJ (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

akram.sadeghi.md@gmail.com

TEACHING POINTS

1. Discuss infectious, inflammatory, and neoplastic pathologies that may be associated with portal venous thrombosis. 2. List abdominal organ imaging findings that may serve as clues to search for portal venous thrombosis. 3. Describe imaging findings of portal venous thrombosis. 4. Differentiate between bland and tumor thrombus on CT and MRI. 5. Weigh treatment options for portal venous thrombosis.

TABLE OF CONTENTS/OUTLINE

Portal venous thrombosis will be discussed in the setting of a variety of hypercoagulable states, including cancer, the postoperative period, and inflammation. A) Hepatocellular carcinoma tumor thrombus B) Gastric adenocarcinoma bland thrombus C) Recent sleeve gastrectomy leading to acute pancreatitis and portal, splenic, and mesenteric vein thrombosis D) Hodgkin lymphoma and Evan's syndrome leading to subacute left and right portal venous thrombosis E) Cholangiocarcinoma tumor thrombus F) Chronic pancreatitis and subsequent development of pancreatic adenocarcinoma G) Pancreatic adenocarcinoma with encasement of portal, splenic, and mesenteric veins H) Infiltrative hepatocellular carcinoma I) Hepatic cirrhosis bland thrombus J) Hepatic and splenic congestion secondary to thrombosis K) Portal venous thrombosis in patient with lupus with fatty liver and simple pancreatic cyst

GI261-ED-X

Gaining the Upper Hand on Upper Abdominal Imaging: Using Ultrasound to Assess the Gastrointestinal Tract for Causes of Abdominal Pain

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Samir Mahboobani, MBBS, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Cillian D. McNamara, BMBCh,MSc, London, United Kingdom (*Presenter*) Nothing to Disclose
Amandeep Sandhu, MBBS, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Chris Schelvan, MRCP, FRCR, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

cillian.mcnamara@nhs.net

TEACHING POINTS

Ultrasound (US) is an invaluable tool in the detection of multiple common causes of acute abdominal pain. An area where US is underutilised is in the assessment of bowel pathology, as many radiologists are unfamiliar with the technique of bowel US and the common sonographic features of bowel pathologies. This exhibit aims to: Illustrate the normal stratified bowel wall anatomy on US. Outline techniques to incorporate into routine abdominal scanning. Discuss the current use of US in acute appendicitis. Explore the emerging application of US to assess other bowel pathology. Illustrate the sonographic features of these pathologies using a pictorial case review, correlating US and subsequent CT findings.

TABLE OF CONTENTS/OUTLINE

Schematic representation of the so-called 'gut signature' using sonographic images and designed illustrations An overview of the features that differentiate abnormal from normal bowel. A review of the different pathologies potentially detectable on US. A series of cases with subsequent CT imaging, showcasing the potential accuracy of US An outline of techniques that can be incorporated into routine studies to investigate upper abdominal pain.

Printed on: 10/29/20

GI262-ED-X

Towards a More Cost-Effective Screening: Risk-Stratified Strategies for HCC Surveillance Using Liver MRI

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
So Hyun Park, MD, Incheon, Korea, Republic Of (*Presenter*) Nothing to Disclose
Cherry Kim, MD, Ansan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Bohyun Kim, MD, Suwon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
So Yeon Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

1. To introduce the concept of liver MRI examination as a surveillance tool in patient with high-risk for hepatocellular carcinoma (HCC) 2. To explain diagnostic performance and cost-effectiveness of liver MRI (i.e.,full-protocol liver MRI using gadoxetic-acid, abbreviated liver MRI) as HCC surveillance tool

TABLE OF CONTENTS/OUTLINE

1. The surveillance tool for patients with high-risk for HCC 1) Background of HCC surveillance 2) Current guidelines and modalities for HCC surveillance 2. HCC surveillance using liver MRI 1) full-protocol liver MRI using gadoxetic-acid: diagnostic performance, survival rate 2) abbreviated liver MRI: suggested sequences and comparison of diagnostic performances among suggested sequences 3. Cost effective analysis of liver MRI for HCC surveillance 1) Target populations for HCC Surveillance 2) Key factors determining the cost-effectiveness of HCC screening 3) Cost-effectiveness by test cost ratio and HCC Incidence

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI263-ED-X

Always Include Lymphoma in the Differential: Abdominopelvic Manifestations of the Great Imitator

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Ryan P. Mitchell, MD, New York, NY (*Presenter*) Nothing to Disclose
Ozair A. Rahman, MBBS, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Lyndon Luk, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

rpm9007@nyp.org

TEACHING POINTS

To review the imaging appearance of extranodal abdominopelvic lymphoma on various imaging modalities (US, CT, MRI) To discuss implications of extranodal lymphoma imaging findings for patient management and treatment To discuss imaging features that may differential extranodal lymphoma from other diagnoses with similar appearance

TABLE OF CONTENTS/OUTLINE

Review of extranodal lymphoma in the abdomen and pelvis Review of the imaging features and different appearances of extranodal lymphoma in the abdomen and pelvis Implications of imaging findings in patient management and treatment Imaging feature comparison of abdominopelvic lymphoma with other diagnoses that may appear similar Summary

GI264-ED-X

When Unresectable Becomes Resectable: New Era in Pancreatic Carcinoma Treatment?

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Constanza V. Martinez, BMBS, Barcelona, Spain (*Presenter*) Nothing to Disclose
Aleksandar Radosevic, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Ana Sierra Vinuesa, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Ander Zugazaga Cortazar, MD, Reus, Spain (*Abstract Co-Author*) Nothing to Disclose
Juan Sanchez Parrilla, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Daniel Flores, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Javier Arce, Badalona, Spain (*Abstract Co-Author*) Nothing to Disclose
Maria Pumar, MBBS, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Laia P. Desmeules, MBBS, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Federico F. Diaz Rojas SR, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Irene Espallargas, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Mar Iglesias I, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Jose Ignacio Poves, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Laura Visa, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Gina Parini, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Guadalupe Aguilar, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

constanzamstocker@gmail.com

TEACHING POINTS

1. To review the criteria of resectability of pancreatic cancer. 2. To assess the response to (neo)adyuvant therapy of border-line or unresectable pancreatic neoplasm and to correlate radiological with pathological findings in operated patients.

TABLE OF CONTENTS/OUTLINE

1.-Introduction and statistics 2.-Patophisiology and Radiological response 3.-Diagnostic-Imagin: a.-Locally advanced tumors b.-Metastatic tumors 4.-Treatment 5.-Summary and take-home points and future.

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI265-ED-X

Autoimmune Pancreatitis: Review of Imaging Findings and Subtypes and Differentiation from Pancreatic Neoplasms

All Day Room: GI Community, Learning Center Digital Education Exhibit

Awards
Certificate of Merit

Participants
Joon Soo Shin, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Nancy A. Hammond, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Camila L. Vendrami, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Pardeep K. Mittal, MD, Augusta, GA (*Abstract Co-Author*) Nothing to Disclose
Elizabeth V. Craig, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Linda C. Kelahan, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Kunal Kothari, New Hyde Park, NY (*Abstract Co-Author*) Nothing to Disclose
Jeanne M. Horowitz, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Senta M. Berggruen, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Frank H. Miller, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

joonsshinrad@gmail.com

TEACHING POINTS

Review the imaging findings of AIP, its subtypes and extrapancreatic manifestations. Review imaging findings that can aid in the distinction between AIP and pancreatic adenocarcinoma and other neoplasms. Review the importance of accurate diagnosis of AIP in light of response to therapy and imaging characteristics of response to therapy.

TABLE OF CONTENTS/OUTLINE

Autoimmune pancreatitis (AIP) is a rare type of chronic pancreatitis secondary to an autoimmune process, which may cause permanent structural and functional damage of the pancreas. There are three recognized patterns of AIP: diffuse, focal and multifocal. Although the diagnosis of AIP has improved because of growing awareness and proposed diagnostic criteria, the differentiation between AIP and pancreatic cancers can be challenging on imaging, particularly for focal AIP. 1. AIP- epidemiology, classifications, subtypes 2. Imaging features of AIP- focal, diffuse, multifocal 3. Distinction of AIP from pancreatic neoplasms 4. Diagnostic approach to these entities 5. Conclusions

GI266-ED-X

Videofluoroscopic Swallowing Studies: Radiologists' Tool to Fight Dysphagia

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Natalia Rueda, MD, Bogota, Colombia (*Presenter*) Nothing to Disclose
Oscar M. Rivero Rapalino, MD, Bogota, Colombia (*Abstract Co-Author*) Nothing to Disclose
Nelson D. Bedoya, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

nruedar@unbosque.edu.co

TEACHING POINTS

As population begins to age, swallowing difficulties are becoming more common. Radiologists play an important role in identifying swallowing dysfunctions by performing diagnostics test to identify abnormal mechanisms of swallowing and diagnose pathologic causes for dysphagia. The most frequently used test to assess swallowing impairments is videofluoroscopy. The main purpose of this exhibit is to introduce an updated review on videofluoroscopic swallowing studies. Concepts will be standardized to understand the importance of this study, how it is performed, when it is indicated and how it is interpreted

TABLE OF CONTENTS/OUTLINE

1. Review anatomy of the oral cavity, larynx, pharynx and superior esophagus2. Comprehend functional mechanisms of swallowing and phases of deglutition3. Understand indications for cineradiography and common pathologies that cause dysphasia4. How to approach the technique to perform a videofluoroscopic swallowing studiesInterpretation of the study:a. Define patterns of oropharyngeal and esophageal dysfunction to identify the site of aspirationb. Identify the occurrence and degree of aspiration6. Importance of the study and impact on the patients7. Conclusions

GI267-ED-X

Following Laparoscopic Sleeve Gastrectomy: Radiological Evaluation, Normal Anatomy and Postoperative Complications

All Day Room: GI Community, Learning Center Digital Education Exhibit

FDA Discussions may include off-label uses.

Participants
Ana Vidal Gonzalez, MD,DIPLPHYS, Madrid, Spain (*Presenter*) Nothing to Disclose
Coral Sanchez Rodriguez, DPhil, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Elena Cebada Chaparro, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Fatima Matute Teresa, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

- To describe the surgical anatomy and normal imaging findings for laparoscopic sleeve gastrectomy. - To identify the possible perioperative and long-term complications of sleeve surgery. - To determine the imaging findings of fluoroscopic upper gastrointestinal exam and abdominal computed tomography (CT) in case of complication.

TABLE OF CONTENTS/OUTLINE

Obesity has become an epidemic disease in the last decades. Bariatric surgery has grown in popularity as treatment of obesity and its comorbidities. Laparoscopic sleeve gastrectomy (LSG) is a relatively recent surgical technique that has surpassed gastric bypass and laparoscopic adjustable gastric banding as the most common weight-loss procedure. Laparoscopy provides a less invasive approach, avoiding some of the complications associated with the classic bariatric surgeries. However, we present several cases of perioperative and long-term complications in patients with LSG. The major imaging tests used to evaluate patients after surgery are fluoroscopic upper gastrointestinal examinations and abdominal computed tomography. The radiological diagnosis will allow the surgical team to decide the patient´s management between conservative treatment or surgical reoperation. - Introduction - Surgical technique - Post-operative radiological findings - Complications o Early complications o Late complications

GI268-ED-X

Pancreatic Zebras (A Collection): A Review of the Imaging Characteristics of Unusual Pancreatic Masses of Pancreatic and Extrapancreatic Origin with Radio-Pathological Correlation-When You Hear Hoofbeats, Think of Zebras Too!

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Amrita Kalantri, MBBS, Vancouver, BC (*Presenter*) Nothing to Disclose
Reem Al Bahrani, MBBS, Dhahran, Saudi Arabia (*Abstract Co-Author*) Nothing to Disclose
Emily Pang, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Alison C. Harris, MBChB, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Silvia D. Chang, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

amrita.kalantri@vch.ca

TEACHING POINTS

Pancreatic adenocarcinomas,IPMNs and neuroendocrine tumours are common in clinical practice. Involvement of pancreas by tumors of extrapancreatic origin is very uncommon.1) In this presentation, we attempt to bring to attention the imaging features of uncommon pancreatic tumours, predominantly of extra pancreatic origin.2) Describe multiple cases to emphasise on the different radiological presentations of the same pathology

TABLE OF CONTENTS/OUTLINE

We retrospectively analysed all cases of pancreatic SOLs which underwent a percutaneous or endoscopic needle biopsy or a resection over a period of 5 years. Among those cases, we found 34 cases with unusual lesions in the pancreas. -Among metastasis, the most common primaries were RCC(40%) followed by malignant melanoma(20%). Other rarer primaries include breast, ovary and a synovial sarcoma from the hip. -The pancreatic lymphomas had varying presentations including pancreatitis and extrahepatic biliary obstruction and varying imaging features.-Cases of acinar cell carcinoma, a rare pancreatic low grade epithelioid neoplasm.-Rare neoplasms in an unexpected clinical setting including an intrapancreatic splenic nodule mimicking a neuroendocrine tumour, an epithelioid neoplasm and an abscess with no clinical suspicion of infection.

GI269-ED-X

AI for Electronic Cleansing in Non-Cathartic CT Colonography

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Rie Tachibana, Boston, MA (*Presenter*) Nothing to Disclose
Janne J. Nappi, PhD, Boston, MA (*Abstract Co-Author*) Royalties, Hologic, Inc Royalties, MEDIAN Technologies
Toru Hironaka, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Hiroyuki Yoshida, PhD, Boston, MA (*Abstract Co-Author*) Patent holder, Hologic, Inc; Patent holder, MEDIAN Technologies;

For information about this presentation, contact:

rtachibana@mgh.harvard.edu

TEACHING POINTS

Electronic cleansing (EC) is used for subtracting tagged materials in CT colonography (CTC) examinations to improve the detection sensitivity of virtual endoscopic fly-through reading. The teaching points of this exhibit are (1) to learn about the differences of deep learning and generative adversarial networks (GANs) in EC and (2) how artificial intelligence (AI) can be used to improve the image quality of EC in non-cathartic CTC examinations.

TABLE OF CONTENTS/OUTLINE

1. Introduction: Review the background of deep learning and EC in CTC. 2. Deep learning and GANs: Explain the difference between deep learning and GANs. 3. AI for EC: How to make use of deep learning and GANs in AI-based EC for CTC. 4. Examples: Demonstrate results of AI-based EC in clinical non-cathartic single- and dual-energy CTC

GI270-ED-X

New Techniques for Abbreviated Protocols and Improved Patient Comfort in Gastrointestinal MRI

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Javier Royuela, Cordoba, Spain (*Presenter*) Nothing to Disclose
Lidia Alcala, MD, Jaen, Spain (*Abstract Co-Author*) Nothing to Disclose
Luis Concepcion, MD,PhD, Alicante, Spain (*Abstract Co-Author*) Nothing to Disclose
Teodoro M. Noguerol, MD, Jaen, Spain (*Abstract Co-Author*) Nothing to Disclose
Antonio Luna, MD,PhD, Jaen, Spain (*Abstract Co-Author*) Speaker, Canon Medical Systems Corporation; Speaker, Koninklijke Philips NV; Speaker, Siemens AG

TEACHING POINTS

To review the new techniques availables for gastrointestinal MRI and their application for protocol abbreviation and reduction of the overall examination time.

TABLE OF CONTENTS/OUTLINE

1. Introduction 2. New techniques for shortering gastrointestinal MRI a. Dixon sequences b. Compressed Sensing c. Isotrophic 3D acquisitions 3. Clinical applications a. Liver b. Rectum c. Anal fistula 4. Conclusions

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI271-ED-X

Single and Double-Contrast Barium Enema in Modern Radiology: Do They Have a Role?

All Day Room: GI Community, Learning Center Digital Education Exhibit

FDA Discussions may include off-label uses.

Participants
Catalina Bravo Lopez I, DIPLPHYS, Mexico City, Mexico (*Presenter*) Nothing to Disclose
Yean P. Silva Hidalgo, MD, Mexico, Mexico (*Abstract Co-Author*) Nothing to Disclose
Daniel A. Rodriguez Quintero, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Paulette Mariette Dautt Medina, MD, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Victor J. Lara Ameca, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Santiago Saavedra, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Cesar N. Cristancho Rojas, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Victoria Rebollo Hurtado, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Jaime A. Saavedra-Abril, MD, Mexico, Mexico (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

catabravolopez7@gmail.com

TEACHING POINTS

1. Analyze the principle objectives of the single and double contrast barium enema.2. Summarize or synthesize the main indications and contraindications of the single and double contrast barium enema.3. Detail the patient preparation method when practicing single and double contrast barium enema.4. Describe the techniques used for the single and double contrast enema. 5. Identify the principle clinical applications of the single and double contrast barium enema (infectious, inflammation, and tumor pathology)

TABLE OF CONTENTS/OUTLINE

1. Introduction2. Objectives3. Identify the principle objectives, indications, and contraindications of the single and double contrast barium enema.4. Describe the preparation method and technique used to realize the single and double contrast barium enema.5. Summarize the principal clinical applications of the single and double contrast barium enema.6. Conclusions. 7. References.

GI287-ED-X

A Pictorial Roadmap of Abdominal Toxicity Induced by Classic Chemotherapeutic Agents and Targeted Therapies: A Challenge for the Oncologist Radiologist

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Ana Ezponda, MD, Pamplona, Spain (*Presenter*) Nothing to Disclose
Marta Calvo-Imirizaldu, MD, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Alberto Paternain, MD, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Patricia Malmierca, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
David Cano, MD, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Maria Arraiza, MD, Zizur Mayor, Spain (*Abstract Co-Author*) Nothing to Disclose
Isabel Vivas Perez, MD, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

aezponda@unav.es

TEACHING POINTS

• To review the classification of classic and newer chemotherapeutic agents. • To illustrate the radiological findings of abdominal toxicity induced by chemotherapeutic drugs. • To emphasize the importance of communication with the ordering physicians to report early manifestations of toxicities. • To review the management of abdominal toxicities in asymptomatic patients.

TABLE OF CONTENTS/OUTLINE

A. History of cancer chemotherapy: from nitrogenous derivates of mustard gas to immunotherapy. B. Classification of classic chemotherapeutic drugs and targeted therapies. C. Imaging findings of abdominal toxicity in an organ system-based approach: a. Liver i. Fatty liver ii. Hepatitis iii. Pseudocirrhosis iv. Hepatic veno-occlusive disease or sinusoidal obstruction syndrome b. Pancreas i. Pancreatitis c. Gallbladder i. Acalculous cholecystitis d. Gastrointestinal tract i. Gastritis ii. Enteritis iii. Clostridium difficile associated colitis iv. Neutropenic colitis or typhilitis v. Ileus vi. Pneumatosis intestinalis vii. Bowel perforation and fistula viii. Delayed anastomotic leak e. Urinary bladder i. Hemorrhagic cystitis f. Vessels i. Arterial thrombosis ii. Vasculitis D. Management of abdominal toxicities in asymptomatic patients.

Printed on: 10/29/20

105TH Scientific Assembly and Annual Meeting
December 1–6 | McCormick Place, Chicago
RSNA 2019 SEE POSSIBILITIES TOGETHER

GI299-ED-X

Transient and Benign Findings in Postoperative Liver Transplant Ultrasound: What Every Radiologist Should Know

All Day Room: GI Community, Learning Center Digital Education Exhibit

FDA Discussions may include off-label uses.

Participants
Marta Calvo-Imirizaldu, MD, Pamplona, Spain (*Presenter*) Nothing to Disclose
Ana Ezponda, MD, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Ignacio Soriano, MD, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Alberto Paternain, MD, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
Alberto Benito, MD, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose
David Cano, MD, Pamplona, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

mcalvoi@unav.es

TEACHING POINTS

The purpose of this exhibit is: 1. To learn about the anatomical aspects and surgical techniques of liver transplantation, with emphasis on the anastomotic techniques 2. To recognize the characteristic appearances of normal liver Doppler waveforms 3. To describe the normal or transitory post liver-transplantation US findings, which will serve as a reference to detect potential complications

TABLE OF CONTENTS/OUTLINE

A. Anatomical and technical aspects of liver transplantation - Type of donors, grafts and recipients - Surgical techniques and anastomoses B. Postoperative liver US examination - Evaluation timeline - Grey scale evaluation: what to include - Doppler US: basics of normal liver Doppler waveforms C. Transient imaging findings after liver transplantation a. Gray-scale assessment: 'starry sky pattern', pneumobilia, subhepatic collections, pleural effusion, ascites... b. Doppler US transient findings in: i. Hepatic artery ii. Portal vein iii. Hepatic veins D. Summary and conclusion

GI315-ED-X

Radiation Dose Reduction in CT Colonography: Basic Concepts and Modern Technologies

All Day Room: GI Community, Learning Center Digital Education Exhibit

Participants
Narumi Taguchi, Kumamoto, Japan (*Presenter*) Nothing to Disclose
Seitaro Oda, MD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Masanori Imuta, MD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasuhiro Yokota, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Sadahiro Yamamura, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Takeshi Nakaura, MD, Amakusa, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasunori Nagayama, MD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Tadatoshi Tsuchigame, MD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomohiro Namimoto, MD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasuyuki Yamashita, MD, Kumamoto, Japan (*Abstract Co-Author*) Consultant, DAIICHI SANKYO Group

TEACHING POINTS

1. There are concerns with respect to potential risks related to the ionizing radiation of CT colonography (CTC). 2. Radiation protection is based on the application of two principles, i.e., justification (appropriate indications) and optimization (appropriate protocols according to purposes). 3. The radiation dose of CTC should be kept at the minimum needed for diagnostically adequate image quality according to examination purposes. 4. To perform appropriate CTC, radiologists should acquire a basic knowledge of radiation exposure from medical imaging, and radiation dose reduction techniques.

TABLE OF CONTENTS/OUTLINE

1. The basic concepts of radiation exposure from medical imaging - Cancer risk related to CT - Great principle of radiation exposure from CT - Incidental findings on CT as a hidden disadvantage - Value-based imaging 2. Radiation exposure in CTC - Current status for radiation exposure in CTC - Challenges for optimization of CTC 3. Reducing the radiation dose for CTC - Considering the scan range - Application of tube current modulation (automatic exposure control) - Iterative CT reconstructions 4. Modern technologies - Tin filter-based spectral shaping CT - Deep learning image reconstruction - Diffusion weighted magnetic resonance imaging

ED005-SU

Gastrointestinal Sunday Case of the Day

Sunday, Dec. 1 7:00AM - 11:59PM Room: Case of Day, Learning Center

AMA PRA Category 1 Credit ™: .50

Participants
Anup S. Shetty, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Cameron Adler, MD, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose
Stephanie T. Chang, MD, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose
Amy K. Hara, MD, Scottsdale, AZ (*Abstract Co-Author*) Nothing to Disclose
Maria Zulfiqar, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Joseph R. Grajo, MD, Gainesville, FL (*Abstract Co-Author*) Nothing to Disclose
Laura L. Magnelli, MD, Gainesville, FL (*Abstract Co-Author*) Nothing to Disclose
Joseph W. Owen, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Michael Nisiewicz, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Andres R. Ayoob, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
James T. Lee, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Rex A. Parker III, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Emilie T. Nguyen, MD, Playa Vista, CA (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Each GI case of the day will be taken from disorders of the luminal GI tract as well as the liver, spleen, pancreas, and biliary system. The findings may be uncommon manifestations of common diseases or common manifestations of uncommon diseases.

SPAI11

RSNA AI Deep Learning Lab: Beginner Class: Classification Task (Intro)

Sunday, Dec. 1 10:30AM - 12:00PM Room: AI Showcase, North Building, Level 2, Booth 10342

AI BR CH CT GI HN IN MR NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Board of Directors, VoiceIt Technologies, LLC; Stockholder, VoiceIt Technologies, LLC; Board of Directors, FlowSigma, LLC; Officer, FlowSigma, LLC ; Stockholder, FlowSigma, LLC

Special Information

In order to get the best experience for this session, it is highly recommended that attendees bring a laptop with a keyboard and decent-sized screen. Having a Gmail account will be helpful. Here are instructions for creating and deleting a Gmail account.

ABSTRACT

This class will focus on basic concepts of convolutional neural networks (CNNs) and walk the attendee through a working example. A popular training example is the MNIST data set which consists of hand-written digits. This course will use a data set we created, that we call 'MedNIST', and consists of images of 6 different classes: Chest X-ray, Chest CT, Abdomen CT, Head CT, Head MR and Breast MRI. The task is to identify the image class. This will be used to train attendees on the basic principles and some pitfalls in training a CNN. • Intro to CNNs • Data preparation: DICOM to jpeg, intensity normalization, train vs test • How do we choose the labels? Inconsistencies... Use Fast.AI routines to classify; Validation of results: Are the performance metrics reliable?; 'Extra Credit': if there is time, explore data augmentation options, effect of batch size, training set size.

Printed on: 10/29/20

SPCT10

Best Clinical Trials @ RSNA 2019

Sunday, Dec. 1 10:45AM - 12:15PM Room: E352

BR GI HP MR NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Udo Hoffmann, MD, Boston, MA (*Moderator*) Research Grant, Kowa Company, Ltd ; Research Grant, Abbott Laboratories; Research Grant, HeartFlow, Inc; Research Grant, AstraZeneca PLC;
David A. Mankoff, MD, PhD, Philadelphia, PA (*Moderator*) Speaker, Koninklijke Philips NV Consultant, General Electric Company Advisory Board, RefleXion Medical Inc Consultant, Blue Earth Diagnostics Ltd Research Funded, Siemens AG Advisory Board, ImaginAb, Inc Spouse, Owner, Trevarx
Ruth C. Carlos, MD, MS, Ann Arbor, MI (*Moderator*) Editor, Journal of the American College of Radiology; Support, Harvey L. Neiman Health Policy Institute; In-kind support, Reed Elsevier;

Sub-Events

SPCT10A MRI in Addition to Mammography Screening in Women with Extremely Dense Breasts: Primary Outcome of the Randomized DENSE Trial

Participants
Marije F. Bakker, PhD, Utrecht, Netherlands (*Abstract Co-Author*) Grant, Bayer AG; Software support, Volpara Health Technologies Limited
Stephanie V. de Lange, Utrecht, Netherlands (*Presenter*) Research Grant, Bayer AG; Software support, Volpara Health Technologies Limited
Rudolf M. Pijnappel, MD,PhD, Haren, Netherlands (*Abstract Co-Author*) Research Grant, Bayer AG
Ritse M. Mann, MD, PhD, Nijmegen, Netherlands (*Abstract Co-Author*) Researcher, Siemens AG Researcher, Seno Medical Instruments, Inc Researcher, Identification Solutions, Inc Researcher, Micrima Limited Researcher, Medtronic plc Scientific Advisor, ScreenPoint Medical BV Scientific Advisor, Transonic Imaging, Inc Stockholder, Transonic Imaging, Inc
Claudette E. Loo, MD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Bob Bisschops, Dordrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Marc Lobbes, MD, Maastricht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Mathijn D. De Jong, MD, 's-Hertogenbosch, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Katya M Duvivier, MD, Amsterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Jeroen Veltman, MD, Hengelo, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Wouter B. Veldhuis, MD, PhD, Utrecht, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Carla H. van Gils, PhD, Utrecht, Netherlands (*Abstract Co-Author*) Software support, Volpara Health Technologies Limited

ABSTRACT

PURPOSE To evaluate the effect of supplemental MRI for women with extremely dense breasts within a population-based screening program. METHOD AND MATERIALS Between 2011-2015, we randomized 40,373 screening participants (aged 50-75) with a negative screening mammography and extremely dense breasts (ACR category 4 by Volpara software) to (an invitation for) supplemental 3.0-T MRI at 8 sites (intervention arm; n=8,061) or mammography screening only (control arm; n=32,312). The difference in interval cancers after the first (prevalent) screening round, during the two-year screening interval, was investigated by intention-to-treat (ITT) analysis, and by complier-average causal effect (CACE) analysis to account for noncompliance. The performance of the incident screening rounds was investigated as well. RESULTS In the intervention arm, 4,783 (59%) underwent MRI examination. Cancer detection rate was 16.5/1000 screens [95%CI:13.3-20.5]. For this, 9.5% of women were recalled (6.3% with biopsy). Positive predictive values are 17.4% [95%CI:14.2%-21.2%] (recall) and 26.3% [95%CI:21.7%-31.6%] (biopsy). In the intervention arm, cancers were more frequently stage 0-I than in the control arm (82.8% vs 41.6%, p<0.001). With ITT analysis, the interval cancer rate was 4.98/1000 women in the control arm and 2.48/1000 women in the intervention arm, leading to a reduction of 2.50/1000 women [95%CI:0.98-3.71]; p<0.001. With CACE analysis, this reduction was 4.22/1000 women [95%CI:2.01-6.43]. Preliminary results of the incident screening rounds showed that 3,548 women had again undergone (at least one) mammographic screening with a negative result. Supplemental cancer detection rate was 5.3/1000 screens [95%CI:3.4-7.7]. For this, 2.8% [95%CI:2.4%-3.4%] of women were recalled for further diagnostic work-up. At the meeting, results on cost-effectiveness will be presented as well. CONCLUSION Supplemental MRI screening in women with extremely dense breasts results in statistically significantly fewer interval cancers. In subsequent rounds, both the cancer detection rate and the false-positive rate decrease. CLINICAL RELEVANCE/APPLICATION There is a heated debate on the value of supplemental screening in women with dense breasts. The DENSE trial is the first randomized trial on supplemental MRI screening that has been performed in women with dense breasts.

SPCT10B Disscussant for MRI In Addition to Mammography Screening

Participants
Christopher E. Comstock, MD, New York, NY (*Presenter*) Nothing to Disclose

SPCT10C 18F-FDG PET-MR Enterography in Predicting Histological Active Disease in Ulcerative Colitis: A Randomized Controlled Trial Using Nancy Index

Participants
Yan Li, Essen, Germany (*Presenter*) Nothing to Disclose
Benedikt M. Schaarschmidt, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose

Lale Umutlu, MD, Essen, Germany (*Abstract Co-Author*) Consultant, Bayer AG
Michael Forsting, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Aydin Demircioglu, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Anna K. Koch, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Ole Martin, Duesseldorf, Germany (*Abstract Co-Author*) Nothing to Disclose
Ken Herrmann, Essen, Germany (*Abstract Co-Author*) Co-founder, SurgicEye GmbH Stockholder, SurgicEye GmbH Consultant, Sofie Biosciences Consultant, Ipsen SA Consultant, Siemens AG Research Grant, Advanced Accelerator Applications SA Research Grant, Ipsen SA
Hendrik Juette, Bochum, Germany (*Abstract Co-Author*) Nothing to Disclose
Andrea Tannapfel, Bochum, Germany (*Abstract Co-Author*) Nothing to Disclose
Jost Langhorst, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose

ABSTRACT

PURPOSE To evaluate the diagnostic performance of PET-MR enterography in detecting histological active inflammation in patients with ulcerative colitis and the impact of bowel purgation on diagnostic accuracies of PET-MR parameters. METHOD AND MATERIALS Fifty patients were enrolled in this randomized controlled trial (clinicaltrials.gov [NCT03781284]). 40 patients were randomized in two study arms, in which bowel purgation was performed either before or after PET-MR enterography. All patients underwent ileocolonoscopy with mucosal biopsies after PET-MR within 24h. Diagnostic performance of MR morphological parameters (MRmorph), diffusion-weighted imaging (DWI) and PET in detecting histological inflammation determined by Nancy index was compared with each other and between study arms. Correlation between PET and histological inflammatory severity was calculated. RESULTS In study arm without previous bowel purgation, SUVmax ratio of bowel segment (relative to SUVmax of the liver) facilitated the highest specificity and diagnostic accuracy compared to MRmorph and DWI. Bowel cleansing led to markedly increased metabolic activity of bowel segments, resulting in significantly reduced specificity of PET compared to study arm without purgation (0.808 vs. 0.966, p = 0.007, respectively). Inter-observer concordance for assessing MRmorph was clearly increased after bowel cleansing (Cohen's κ: 0.847 vs. 0.665, p = 0.013, respectively), though diagnostic performance of MRmorph was not significantly improved. Our findings suggested that the change of metabolic status was mainly associated with the grade of neutrophil infiltrate and less dependent on chronic infiltrate. CONCLUSION PET-MR enterography was an excellent non-invasive diagnostic method in the assessment of ulcerative colitis without the need of previous bowel purgation. CLINICAL RELEVANCE/APPLICATION SUVmaxRatio was a reliable parameter facilitating best diagnostic operating characteristics in predicting histological active disease in patients with ulcerative colitis and no previous bowel purgation was needed for PET-MR.

SPCT10D Discussant for 18F-FDG PET-MR Enterography

Participants
Joel G. Fletcher, MD, Rochester, MN (*Presenter*) Grant, Siemens AG; Consultant, Medtronic plc; Consultant, Takeda Pharmaceutical Company Limited; Grant, Takeda Pharmaceutical Company Limited; ;

SPCT10E Clinical and Cost-Effectiveness Implications of Utilizing Immediate Acute Magnetic Resonance Imaging (MRI) in the Management of Patients with Suspected Scaphoid Fracture and Negative Initial Radiographs: Results from a Randomized Clinical Trial

Participants
Tiago Rua, BSC,MSc, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Sanjay Vijayanathan, MBBS, Harrow, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Davina Mak, MBBS, BSC, Middlesex, United Kingdom (*Presenter*) Nothing to Disclose
Alireza Zavareh, MD, FRCR, Bristol, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Amanda Isaac, MBChB, FRCR, Rickmansworth, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Bharti Malhotra, MBA, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Laura Hunter, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Janet Peacock, PhD, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
James Shearer, PhD, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Vicky J. Goh, MBBCh, Chalfont St Giles, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Paul McCrone, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Sam Gidwani, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

ABSTRACT

PURPOSE Given the limited accuracy of radiographs on presentation to the Emergency Department (ED), the management of suspected scaphoid fractures remains clinically challenging and an economic burden to healthcare systems. This trial evaluated the clinical and cost-effectiveness implications of using immediate Magnetic Resonance Imaging (MRI) as an add-on test during the ED attendance for patients with negative findings on the initial radiographs. METHOD AND MATERIALS A pragmatic, randomized, single-center trial compared the use of immediate MRI for patients presenting to the ED with suspected scaphoid fractures against standard care with radiographs only. Participants' use of health services was estimated from primary care and secondary care databases and questionnaires at baseline, 3 and 6 months post-recruitment. Costs were compared using generalized linear models and combined with quality-adjusted life years (QALYs) to estimate cost-effectiveness. RESULTS A total of 136 participants were recruited based on 1:1 ratio, block randomization methods (mean age 37 years; 57% male; 79% full-time employed). 6.2% (4/65, control group) and 10% (7/67, intervention group) of participants sustained scaphoid fractures (p=0.37). 7.7% (5/65, control group) and 22% (15/67, intervention group) of participants had other fractures diagnosed (p=0.019). The use of MRI increased the diagnostic accuracy both in the diagnosis of scaphoid fracture (100.0% vs 93.8%) and any other fracture (98.5% vs 84.6%). Mean (SD) cost per participant up to 3 months post-recruitment was £542.4 (£855.2) for the control group and £368.4 (£338.6) for the intervention, leading to a cost difference of £174 (95% CI -£30 to £378, p=0.094). The cost difference per participant at 6 months increased to £266 (95% CI £3.3 to £528, p=0.047). The MRI intervention dominated standard care costing less and achieving more QALY gains, presenting a probability of 96% and 100% of being cost-effective at month 3 and 6 considering traditional willingness-to-pay thresholds. CONCLUSION The use of immediate MRI in the management of participants with suspected scaphoid fracture and negative radiographs led to significant cost-savings whilst improving and expediting the pathway's diagnostic accuracy. CLINICAL RELEVANCE/APPLICATION The immediate use of MRI in the management of suspected scaphoid fractures should be included as part of standard of care as an add-on test for patients with negative radiographs.

SPCT10F Discussant for Clinical and Cost-Effectiveness Implications

Participants
Garry E. Gold, MD, Stanford, CA (*Presenter*) Research support, General Electric Company

SPCT10G Imaging-guided Target Volume Reduction in Radiotherapy of Lung Cancer: The Prospective Randomized Multinational PET-Plan Trial

Participants
Tanja Schimek-Jasch, MD, Freiburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Ursula Nestle, MD,PhD, Monchengladbach, Germany (*Presenter*) Nothing to Disclose
Stephanie Kremp, DIPLPHYS, Homburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Andrea Schaefer, PhD, Homburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Andreas Kusters, MD, Krefeld, Germany (*Abstract Co-Author*) Nothing to Disclose
Marco Tosch, MD, Wuppertal, Germany (*Abstract Co-Author*) Nothing to Disclose
Thomas Hehr, MD,PhD, Stuttgart, Germany (*Abstract Co-Author*) Nothing to Disclose
Martina Eschmann, Stuttgart, Germany (*Abstract Co-Author*) Nothing to Disclose
Yves-Pierre Bultel, Trier, Germany (*Abstract Co-Author*) Nothing to Disclose
Peter Hass, Magdeburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Jochen Fleckenstein, Homburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Alexander Thieme, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Marcus Stockinger, Mainz, Germany (*Abstract Co-Author*) Nothing to Disclose
Matthias Miederer, Mainz, Germany (*Abstract Co-Author*) Nothing to Disclose
Gabriele Holl, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Christian Rischke, MD, Kirchzarten, Germany (*Abstract Co-Author*) Nothing to Disclose
Sonja Adebahr, MD, Freiburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Eleni Gkika, Freiburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Jochem Koenig, Mainz, Germany (*Abstract Co-Author*) Nothing to Disclose
Anca-Ligia Grosu, Freiburg, Germany (*Abstract Co-Author*) Nothing to Disclose

ABSTRACT

PURPOSE Advanced medical imaging offers a chance for target volume reduction in modern radiotherapy, which may lead to more effective local treatments with reduced toxicity and offer the protection of draining lymph nodes and large vessels, possibly of importance for the upcoming combination of radiotherapy and immunotherapy. Locally advanced non-small cell lung cancer (NSCLC) with improvable local control and high toxicity is an excellent model to investigate this topic. METHOD AND MATERIALS In the prospective randomised controlled PET-Plan trial (NCT00697333), patients with inoperable stage II/III NSCLC and an indication for radiochemotherapy were randomized at a 1:1 ratio. In conventional arm A target volumes were informed by FDG-PET and CT plus elective nodal irradiation and in experimental arm B they were solely informed by FDG-PET. In both arms, quality assured isotoxically dose-escalated IMRT or 3D-CRT (60 - 74Gy, 2Gy per fraction) was planned and applied to the respective target volumes along with simultaneous platinum-based chemotherapy. The primary objective was time to locoregional progression (LRP) in terms of non-inferiority of experimental arm B. RESULTS 311 patients were recruited, 205 patients included in the intent to treat (ITT) (A: n=99, B: n=106) and 172 patients in the per protocol (PP) analysis (A: n=84, B: n=88). Median FU time in the PP set was 16 months. Non-inferiority of experimental arm B was confirmed for the pre-specified non-inferiority margin. The risk of LRP was lower in the experimental arm B (2y-LRP 0.20 vs. 0.39; HR=0·57; 95% CI: 0·30-1·06; p=0·039) with no difference between study arms concerning survival (2y-OS 0.57 vs. 0.54), out-field recurrence and toxicity. CONCLUSION In radiochemotherapy for locally advanced NSCLC, PET-Imaging based reduction of radiotherapy target volumes is feasible and may improve local control without increasing toxicity. CLINICAL RELEVANCE/APPLICATION The procedures established in this clinical trial provide a radiotherapy standard for future NSCLC trials including immunotherapy and may furthermore inspire trials on imaging based target volume reduction for other tumor types.

SPCT10H Discussant for Imaging-guided Target Volume Reduction

Participants
Daniel Pryma, MD, Philadelphia, PA (*Presenter*) Research Grant, Siemens AG; Research Grant, 511 Pharma; Research Grant, Progenics Pharmaceuticals, Inc; Research Consultant, Progenics Pharmaceuticals, Inc; Research Consultant, 511 Pharma; Research Consultant, Actinium Pharmaceuticals, Inc; Research Consultant, Nordic Nanovector ASA

SSA07

Gastrointestinal (LIRADS)

Sunday, Dec. 1 10:45AM - 12:15PM Room: S103AB

GI MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Khaled M. Elsayes, MD, Pearland, TX (*Moderator*) Nothing to Disclose
Kathryn J. Fowler, MD, San Diego, CA (*Moderator*) Consultant, 12 Sigma Technologies; Researcher, Nuance Communications, Inc; Contractor, Midamerica Transplant Services; ;
Alexa G. Ortiz Escobar I, MD, Mexico City, Mexico (*Moderator*) Nothing to Disclose

Sub-Events

SSA07-01 Accuracy of Liver Imaging Reporting and Data System Category 4 or 5 for Diagnosing Hepatocellular Carcinoma: A Systematic Review and Meta-Analysis

Sunday, Dec. 1 10:45AM - 10:55AM Room: S103AB

Participants
Dong Hwan Kim, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Sang Hyun Choi, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seong Ho Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Research Grant, Central Medical Service Co, Ltd
Kyung Won Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jae Ho Byun, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
So Yeon Kim, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seung Soo Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yong Moon Shin, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyung Jin Won, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Pyo Nyun Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

edwardchoi83@gmail.com

PURPOSE

We aimed to systematically determine the accuracy of Liver Imaging Reporting and Data System (LI-RADS) for magnetic resonance imaging (MRI) diagnosis of hepatocellular carcinoma (HCC) and to determine the sources of heterogeneity between reported results.

METHOD AND MATERIALS

Original studies that reported the diagnostic accuracy of LI-RADS for HCC using MRI were identified in MEDLINE and EMBASE up to October 25, 2018. Study quality was assessed using QUADAS-2. We categorized studies into two groups, LR-5, and LR-4 or LR-5, criteria, and obtained the meta-analytic summary sensitivity and specificity of both criteria with a bivariate random-effects model. Subgroup analyses and meta-regression analysis were performed to further explore study heterogeneity.

RESULTS

Among the 157 articles screened, 18 studies covered LR-5 (3651 lesions), and 16 studies covered LR-4 or LR-5 (3182 lesions). For the LR-5 criterion, the meta-analytic summary sensitivity and specificity were 62.1% (95% CI [confidence interval], 53.9-69.7%; $I2$=91.6%) and 92.8% (95% CI, 89.9-94.9%; $I2$=66.8%), respectively (Fig. 1A). For the LR-4 or LR-5 criterion, the meta-analytic summary sensitivity and specificity were 88.4% (95% CI, 82.7-92.5%; $I2$=89.2%) and 81.7% (95% CI, 73.5-87.8%; $I2$=88.3%), respectively (Fig. 1B). For the LR-5 criterion, the three factors of subject enrollment, MRI scanner field strength, and type of reference standard were significantly associated with study heterogeneity (P <= 0.04). For the LR-4 or LR-5 category criterion, the three factors of subject enrollment, MRI contrast agent, and type of reference standard were significantly associated with study heterogeneity (P <= 0.03).

CONCLUSION

The LR-5 criterion was highly specific, but showed suboptimal sensitivity for diagnosing HCC in patients at risk of HCC. In comparison with the LR-5 criterion, the sensitivity of the LR-4 or LR-5 criterion increased, but the specificity decreased. Substantial study heterogeneity was noted, and four significant factors were identified: subject enrollment, the type of reference standard, MRI scanner field strength, and contrast agent type.

CLINICAL RELEVANCE/APPLICATION

The LR-5 criterion was highly specific, but had suboptimal sensitivity for diagnosing HCC. Substantial study heterogeneity was noted, and further randomized controlled studies are needed to validate the diagnostic performance of LI-RADS.

SSA07-02 Using Ancillary Features to Update Liver Imaging Reporting and Data System version 2018 on Gadobenate Dimeglumine-Enhanced MRI

Sunday, Dec. 1 10:55AM - 11:05AM Room: S103AB

Participants
Yao Zhang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Jingbiao Chen, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Sichi Kuang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Bingjun He, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Kathryn J. Fowler, MD, San Diego, CA (*Abstract Co-Author*) Consultant, 12 Sigma Technologies; Researcher, Nuance Communications, Inc; Contractor, Midamerica Transplant Services; ;
Claude B. Sirlin, MD, San Diego, CA (*Abstract Co-Author*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc
Jin Wang, MD, Guangzhou, China (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

569874016@qq.com

PURPOSE

To evaluate whether ancillary features on gadobenate dimeglumine-enhanced MRI can be used to upgrade LI-RADS categories from LR-4 to LR-5.

METHOD AND MATERIALS

260 patients with chronic liver disease at high risk for HCC were retrospectively included. Hepatobiliary phase (HBP) was obtained 2 hours after gadobenate dimeglumine injection at 3.0T scanner, and all HBP images can be used to evaluate liver observations according to LI-RADS criteria. Blinded to the clinical and pathological data, two abdominal radiologists evaluated LI-RADS v2018 major and ancillary features for the largest observation in each patient on MR images in consensus. Observations were categorized according to LI-RADS version 2018 as well as various modifications to LI-RADS, in which LR-4 could be upgraded to LR-5 by the presence of ancillary features as listed in Table 1. Diagnostic sensitivity, specificity, accuracy, false negative rate (FNR), false positive rate (FPR), positive predictive value (PPV), negative predictive value (NPV) of category LR- 5 were calculated for LI-RADS v2018 and for each modified LI-RADS. Receiver operating characteristic (ROC) curves were generated and areas under the ROC curve (AUC) were computed.

RESULTS

Final diagnoses for the 260 observations included 216 HCCs, 5 intrahepatic cholangiocarcinomas, 5 combined hepatocellular-cholangiocarcinomas, 2 metastatic tumors, 2 focal nodular hyperplasias, 7 arterio-portal shunts, 20 hemangiomas, 1 abscess, 1 cyst, and 1 dysplastic nodule. Overall, 0% LR-1(0/2) and LR-2 (0/28), 90% (10/11) LR-3, 86% LR-4 (19/22), and 99% LR-5 (174/175) were HCCs according to LI-RADS v2018. The final LI-RADS categories, as well as the sensitivity, specificity, accuracy, FNR, FPR, PPV, NPV and AUC of LR-5 using v2018 and each modified LI-RADS are listed in table 1. Modified LI-RADS I (in which HBP hypointensity can be used to upgrade LR-4 to LR-5) showed higher sensitivity (94.4 vs 80.6%) and accuracy (93.5 vs 83.5%) than LI-RADS v2018 without significantly reducing specificity (88.6 vs 97.7%), PPV (97.6 vs 99.4%), or AUC (0.915 vs 0.891).

CONCLUSION

Modified LI-RADS I may improve sensitivity and accuracy for diagnosing HCC without impairing specificity or positive predictive value.

CLINICAL RELEVANCE/APPLICATION

HBP hypointensity may be used to upgrade LR-4 to LR-5 without impairing specificity or positive predictive value for a diagnosis of HCC on gadobenate dimeglumine-enhanced MRI in Chinese patients.

SSA07-03 Effect of Upgrading LR-4 Lesions to LR-5 Using HCC Favoring Ancillary Features on Diagnostic Performance of HCC

Sunday, Dec. 1 11:05AM - 11:15AM Room: S103AB

Participants
Jae Hyon Park, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Yong Eun Chung, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jin-Young Choi, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Mi-Suk Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Myeong-Jin Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Research grant, Bayer Pharma AG; Honoraium, Guerbet SA, GE healthcare, Philips, and Siemens Healthineers

For information about this presentation, contact:

YELV@yuhs.ac

PURPOSE

To determine whether upgrading LR-4 lesion to LR-5 using ancillary features (AF) favoring HCC in LI-RADS version 2018 increases the diagnostic performance of HCC.

METHOD AND MATERIALS

112 patients with chronic B-, C- viral hepatitis or cirrhosis and surgically proven primary hepatic malignancy (98 HCC, 11 cHCC-CCC, 2 IHCC, 1 dysplastic nodule) were evaluated with gadoxetate-enhanced MRI in 2013. Two board-certified radiologists retrospectively assessed the presence of major features of HCC, imaging features of LR-M criteria, and HCC favoring ancillary features according to LI-RADS v2018 and assigned an LI-RADS category for each nodule in consensus. The diagnostic accuracy of

each LI-RADS category was described by sensitivity, specificity and positive and negative predictive values with 95% confidence interval. LR-4 lesions were then upgraded to LR-5 if (1) at least one HCC favoring AF was present and (2) lesion was not previously upgrade from LR-3 to LR-4. Diagnostic accuracy of this upgraded LR-5 was compared to initial LR-5 using McNemar X2-test. 5-year overall survival (OS) was evaluated via Kaplan-Meier method, log rank test and Cox proportional hazard model.

RESULTS

All three out of three LR-3 lesions, 18 (85%) out of 21 LR-4 lesions, 70 (98%) out of 71 LR-5 lesions and 7 (41%) out of 17 LR-M lesions were HCCs. As for non-HCC malignancy, except for 3 (27%) out of 11 cHCC-CCCs and 1 dysplastic nodule, all non-HCC malignancy were assigned as LR-M. 9 (42%) out of 21 initial LR-4 lesions were upgraded to LR-5 due to more than one HCC favoring AF. For HCC, initial LR-5 showed sensitivity and specificity of 71.4% and 92.8%, while HCC favoring AF-upgraded LR-5 showed sensitivity and specificity of 79.6% and 85.7%. Accuracy of upgraded LR-5 was 80.4% compared to 74.1% of initial LR-5. In McNemar X2-test, specificity of initial LR-5 was not significantly different from specificity of upgraded LR5 (P=0.317).

CONCLUSION

Upgrading LR-4 lesions to LR-5 increases accuracy without significantly decreasing HCC specificity; thus HCC favoring AF can be used to upgrade LR-4 to LR-5.

CLINICAL RELEVANCE/APPLICATION

Contrary to LI-RADS v2018, HCC favoring ancillary features should be used to upgrade LR-4 lesions to LR-5 because it increases accuracy of HCC without significantly decreasing HCC specificity.

SSA07-04 Assessing Accuracy of the LI-RADS v2017 Treatment Response Algorithm in Evaluating Ablated Hepatocellular Carcinoma

Sunday, Dec. 1 11:15AM - 11:25AM Room: S103AB

Participants
Mohammad Chaudhry, MBBS, Durham, NC (*Presenter*) Nothing to Disclose
Katrina A. McGinty, MD, Chapel Hill, NC (*Abstract Co-Author*) Nothing to Disclose
Benjamin Mervak, MD, Chapel Hill, NC (*Abstract Co-Author*) Nothing to Disclose
Erin Shropshire, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
James S. Ronald, MD, PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Leah Commander, Chapel Hill, NC (*Abstract Co-Author*) Nothing to Disclose
Johann Hertel, MD, Chapel Hill, NC (*Abstract Co-Author*) Nothing to Disclose
Reginald Lerebours, MA, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Cai Li, PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Sheng Luo, PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Mustafa R. Bashir, MD, Cary, NC (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, NGM Biopharmaceuticals, Inc; Research Grant, Madrigal Pharmaceuticals, Inc; Research Grant, Metacrine, Inc; Research Grant, Pinnacle Clinical Research; Research Grant, ProSciento Inc; Research Grant, Carmot Therapeutics; Research Grant, 1Globe Health Institute; Research Consultant, ICON plc;
Lauren M. Burke, MD, Chapel Hill, NC (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

mohammad.b.waseem@gmail.com

PURPOSE

To assess the performance of the LI-RADS v2017 Treatment Response Algorithm (TRA) in identifying viability of ablated hepatocellular carcinoma (HCC).

METHOD AND MATERIALS

This was an Institutional Review Board approved and HIPAA compliant retrospective study. Patients who underwent ablation of HCC prior to liver transplantation between January 1, 2011, and December 31, 2015, at a single tertiary care center were identified. All patients underwent pretreatment abdominal MRI within 90 days of treatment and post-treatment MRI within 90 days of transplant. Based on transplant histopathology colocalized with imaging, lesions were categorized as completely (100%) or incompletely (<=99%) necrotic. Three radiologists classified each nodule into an LR-TR category (Viable/Non-Viable) according to imaging features. Final LR-TR categories were compared with histopathology and the correlation was calculated. Inter-reader agreement was assessed using Fleiss' Kappa.

RESULTS

36 patients with 53 lesions were included. 58% (31/53) of lesions were ablated using microwave ablation, and the remaining 42% (22/53) with radiofrequency ablation. TRA accuracy for predicting complete tumor necrosis at the time of transplant ranged from 0.75-0.78, with a negative predictive value ranging from 0.77-0.80. Accuracy for predicting incomplete tumor necrosis at the time of transplant ranged from 0.61-0.78, with a positive predictive value ranging from 0.68-0.89. 11% (6/53) of treated lesions were LR-TR Equivocal by consensus, with most (5/6) incompletely necrotic on histopathology. Inter-reader agreement for pre-treatment LI-RADS category was k=0.44 (95% CI 0.16-0.62), lower than agreement for TRA category, k=0.68 (95% CI 0.57-0.78).

CONCLUSION

The TRA is accurate in predicting viable or non-viable HCC after ablation. Of the ablated lesions rated as LR-TR Equivocal, many were incompletely necrotic nodules.

CLINICAL RELEVANCE/APPLICATION

The LI-RADS TRA's performance for predicting histopathological necrosis in HCC lesions following locoregional therapy has not been extensively assessed, and in this work is shown to be accurate.

SSA07-05 Ancillary Features in LI-RADS Version 2018: A Strategy to Improve Diagnostic Performance for HCC on Gadoxetate Disodium-enhanced MRI

Sunday, Dec. 1 11:25AM - 11:35AM Room: S103AB

Participants
Jihun Kang, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Sang Hyun Choi, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jae Ho Byun, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Dong Hwan Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
So Jung Lee, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
So Yeon 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
Yong Moon Shin, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Pyo Nyun Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jhbyun@amc.seoul.kr

PURPOSE

To determine the frequency of occurrence and strength of association with hepatocellular carcinoma (HCC) of each ancillary feature (AF) in the Liver Imaging Reporting and Data System (LI-RADS) version 2018, and to develop an appropriate strategy for applying the AFs to improve diagnostic performance on gadoxetate disodium-enhanced MRI.

METHOD AND MATERIALS

A total of 385 nodules (283 HCCs, 18 non-HCC malignancies, 84 benign nodules) of 3.0 cm or smaller in 266 patients at risk for HCC who underwent gadoxetate disodium-enhanced MRI in 2016 were retrospectively evaluated. Two radiologists independently assigned a LI-RADS category to each nodule. The frequency and diagnostic odds ratio of each AF were assessed. To improve the diagnostic performance for HCC, various criteria were developed based on the number of AFs detected favoring malignancy in general or HCC in particular. Generalized estimating equation models were used to compare the diagnostic performance of each criterion with that of the major features (MFs) only.

RESULTS

The AFs showing a significantly different frequency between HCC and non-HCC lesions were restricted diffusion, mild-moderate T2 hyperintensity, transitional-phase hypointensity, hepatobiliary-phase hypointensity, and hepatobiliary-phase isointensity. Of these AFs, hepatobiliary-phase hypointensity had the highest frequency and strongest association with HCC. When we applied AFs in addition to MFs, the new criterion (with a number of AFs >=4) had significantly higher sensitivity (80.6% vs. 70.0%; *P*<.001) than MFs only, without a significant lowering of specificity (85.3% vs. 90.2%; *P*=.060).

CONCLUSION

The AFs varied in the frequencies of occurrence and strengths of association with HCC. To improve the diagnostic performance for HCC, a new criterion of four or more AFs in addition to the MFs might be the best option.

CLINICAL RELEVANCE/APPLICATION

A criterion of four or more AFs in addition to MFs may be the best strategy to improve the diagnostic performance for HCC on gadoxetate disodium-enhanced MRI using LI-RADS, and is recommended in the evaluation of suspected HCC in patients at risk.

SSA07-06 LI-RADS v2018: Value of Quantitative Assessment of Arterial Phase Hyperenhancement and Washout with Extracellular MRI Contrast Agent

Sunday, Dec. 1 11:35AM - 11:45AM Room: S103AB

Participants
Daniel Stocker, MD, Zurich, Switzerland (*Presenter*) Nothing to Disclose
Anton S. Becker, MD,PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Borna Barth, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Stephan M. Skawran, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Malwina Kaniewska, MD, Baden, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Michael A. Fischer, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Olivio Donati, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Caecilia S. Reiner, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

daniel.stocker@usz.ch

PURPOSE

To assess the influence of quantitative arterial phase hyperenhancement (APHE) and washout (WO) of contrast enhanced MRI on LI-RADS v2018 categorization and compare the quantitative LI-RADS score with conventional qualitative reading.

METHOD AND MATERIALS

60 patients (19 female; mean age 56y) at risk for HCC with 71 liver lesions (28 hepatocellular carcinoma (HCC), 43 benign lesions) who underwent MRI with extracellular contrast agent were included in this HIPPA-compliant retrospective study. Four blinded radiologists independently reviewed all MRI and assigned a LI-RADS score per lesion. Two other radiologists drew regions of interests within the lesion and the adjacent liver parenchyma on pre- and post-contrast MR images. The percentage of arterial enhancement and the liver-to-lesion contrast ratio were calculated for quantification of APHE and WO. The presence or absence of APHE, WO or both was recorded according to the quantitative measurements. Using these quantitative parameters, a quantitative LI-RADS score was assigned in lesions classified as LR-3-5. The diagnostic accuracy was assessed with receiver-operating-characteristics (ROC) analysis and the DeLong test to compare for significant differences between the area under the curve (AUC).

RESULTS

The ROC analysis for the qualitative LI-RADS score showed an AUC of 0.869, 0.946, 0.940 and 0.919 for reader 1, 2, 3, and 4, respectively. The quantitative LI-RADS score where only APHE/WO/or both were replaced showed an AUC of 0.875/0.849/0.874, 0.942/0.924/0.914, 0.933/0.917/0.878 and 0.902/0.852/0.843 for readers 1, 2, 3 and 4, respectively. The AUC of the quantitative LI-RADS score was significantly lower than of the qualitative score only for reader 4 when quantitative WO (p=0.012) and both, quantitative APHE and WO (p=0.047) were used.

CONCLUSION

The qualitative LI-RADS score showed similar or higher diagnostic accuracy compared to the quantitative LI-RADS score. Therefore, qualitative visual assessment appears to be the better approach to scoring liver lesions according to LI-RADS v2018.

CLINICAL RELEVANCE/APPLICATION

A quantitative approach for LI-RADS scoring does not increase diagnostic accuracy; hence, visual assessment should be maintained to score liver lesions according to LI-RADS v2018.

SSA07-07 Hepatocellular Carcinoma Detection by Abbreviated-Protocol Dynamic Contrast-enhanced MRI in Patients with Cirrhosis Using LI-RADS v2018

Sunday, Dec. 1 11:45AM - 11:55AM Room: S103AB

Participants
Takeshi Yokoo, MD, PhD, Dallas, TX (*Presenter*) Nothing to Disclose
Lakshmi Ananthakrishnan, MD, Irving, TX (*Abstract Co-Author*) Nothing to Disclose
Alberto Diaz de Leon, MD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose
David T. Fetzer, MD, Dallas, TX (*Abstract Co-Author*) Researcher, Koninklijke Philips NV; Researcher, Siemens AG; Consultant, Koninklijke Philips NV; Speakers Bureau, Koninklijke Philips NV; Speakers Bureau, Siemens AG ; ;
John R. Leyendecker, MD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose
Ivan Pedrosa, MD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose
Gaurav Khatri, MD, Irving, TX (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Determine the accuracy of abbreviated-protocol dynamic contrast enhanced MRI and complete-protocol MRI for detection of hepatocellular carcinoma (HCC) in cirrhosis patients

METHOD AND MATERIALS

In this IRB-approved HIPAA-compliant retrospective cohort study, 100 consecutive cirrhosis patients underwent standard complete-protocol MRI (cMRI) at 1.5T or 3T for workup for suspected HCC, using extracellular gadolinium contrast. Images of abbreviated-protocol MRI (aMRI; coronal T2-weighted and axial dynamic contrast-enhanced T1-weighted sequences) were extracted from cMRI (aMRI sequences + unenhanced axial T2-, T1-, and diffusion-weighted sequences). Both aMRI and cMRI images were independently read by 4 blinded fellowship-trained abdominal radiologists using Liver Imaging and Reporting Data System (LI-RADS) v2018. Each review (aMRI, cMRI) was scored as positive if any liver observation of LR-4, 5, or M was present, or negative otherwise. Each patient was followed from the time of index cMRI until final HCC status was determined using a composite reference standard of histopathlogy <=6 months, consensus expert panel review of index cMRI or followup-CT/MRI <=6 months (by two different senior abdominal radiologists), and clinic followup at >12 months (in those with negative index cMRI only). Patient-level HCC detection sensitivity and specificity were calculated for aMRI and cMRI with 95% confidence intervals, and compared by McNemar's test at a=0.05.

RESULTS

Mean age of the study cohort was 57.7 years (range 23-77). 14 patients were excluded due to non-diagnostic exam (5), prior HCC treatment (1), use of hepatobiliary contrast agent (1), loss to followup (3), and unable to determine final HCC diagnosis (4). Per-reader detection accuracy of aMRI and cMRI in remaining 86 cirrhosis patients are shown in Figure. No statistically significant differences were found by McNemar's test (p>0.05) between aMRI and cMRI, in sensitivity or specificity.

CONCLUSION

Abbreviated-protocol dynamic contrast enhanced MRI has sensitivity 89.3-96.4% and specificity 84.5-89.7% for HCC detection; no statistically significant difference was found compared to complete-protocol MRI. Further validation is needed in an asymptomatic cirrhosis population to support its use as a screening test.

CLINICAL RELEVANCE/APPLICATION

Abbreviated-protocol dynamic contrast enhanced MRI (a 15-min exam) offers high sensitivity and specificity for hepatocellular carcinoma (HCC) detection and has a potential as a screening test in cirrhosis patients at risk for HCC.

SSA07-08 Inter-reader Reproducibility and Overall Survival Predictability of LI-RADS Tumor Response Algorithm after Drug-eluting-Beads Transarterial Chemoembolization as an Initial Treatment Hepatocellular Carcinoma

Sunday, Dec. 1 11:55AM - 12:05PM Room: S103AB

Participants
Ali Pirasteh, MD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose
Endel A. Sorra II, MD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose
Hector J. Marquez, MD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose
Robert C. Sibley III, MD, Irving, TX (*Abstract Co-Author*) Nothing to Disclose
Takeshi Yokoo, MD, PhD, Dallas, TX (*Presenter*) Nothing to Disclose

PURPOSE

LI-RADS (Liver Imaging and Reporting Data System) Tumor Response (LR-TR) algorithm standardizes the assessment of tumor

response to locoregional therapy in hepatocellular carcinoma (HCC). This study evaluated the inter-reader reproducibility of LR-TR categories (nonviable, equivocal, viable), and whether LR-TR categories predict survival in patients with HCC after first-time drug-eluting-beads transarterial chemoembolization (DEB-TACE).

METHOD AND MATERIALS

All DEB-TACE procedures from 2011 to 2015 at two hospitals affiliated with a liver transplant center were reviewed. Key exclusion criteria were prior HCC-related treatment and lack of pre- and post-treatment multiphasic abdominal MRI or CT within 3 months of DEB-TACE. Four readers (2 radiology residents and 2 fellowship-trained abdominal radiologists) independently reviewed the pre-and post-treatment exams, assigned LR-TR categories to up to two treated tumors per patient, and measured the size of the pre-treatment and the enhancing component of the treated tumor. Inter-reader agreement for LR-TR categories and tumor size were respectively assessed by Fleiss' kappa and intra-class correlation coefficient (ICC). Kaplan-Meier/Cox survival analysis for patient-level LR-TR category (the mode of all lesion LR-TR categories by all readers in a patient) was performed, before and after adjusting for Barcelona Clinic for Liver Cancer stage (BCLC A vs. >=B) and Child-Pugh-Turcott class (CPT A vs. >=B).

RESULTS

75 patients were included, yielding 108 lesions. Inter-reader agreement was moderate for the three LR-TR categories (κ=0.56 [0.55,0.58]). Inter-reader reproducibility for tumor size was excellent for untreated tumors (ICC=0.94 [0.92,0.95]) and good for treated tumors (ICC=0.83 [0.78,0.87]). No significant difference was detected in overall survival between LR-TR nonviable and viable groups (Fig. 1) before or after adjustment for BCLC stage/CPT class, respectively p=0.96 and 0.78.

CONCLUSION

LI-RADS tumor response algorithm for HCC after first-time DEB-TACE has moderate inter-reader reproducibility but may not predict overall survival. Further reader education/training is needed to improve reproducibility. Further research is needed to better translate LR-TR assessment to predict patient survival/guide therapy.

CLINICAL RELEVANCE/APPLICATION

LI-RADS tumor response algorithm for HCC requires reader education and may not predict survival in patients undergoing first-time DEB-TACE.

SSA07-09 Clinical Validation of CEUS LI-RADS in Prospective Multi-Center Study: Preliminary Results

Sunday, Dec. 1 12:05PM - 12:15PM Room: S103AB

Participants
Andrej Lyshchik, MD, PhD, Philadelphia, PA (*Presenter*) Research support, Bracco Group; Advisory Board, Bracco Group; Research support, General Electric Company; Research support, Siemens AG; Research support, Canon Medical Systems Corporation; Speaker, SonoScape Co, Ltd
Yuko Kono, MD, PhD, San Diego, CA (*Abstract Co-Author*) Equipment support, Canon Medical Systems Corporation Equipment support, General Electric Company Contrast agent support, Lantheus Medical Imaging, Inc Contrast agent support, Bracco Group
Fabio Piscaglia, Bologna, Italy (*Abstract Co-Author*) Research support, Esaote SpA; Speaker, Bayer AG; Speaker, Bracco Group; Speaker, Bristol-Myers Squibb Company; Speaker, Eisai Co, Ltd; Advisory Board, AstraZeneca PLC; Advisory Board, Bayer AG; Advisory Board, Eisai Co, Ltd; Advisory Board, General Electric Company; Advisory Board, Siemens AG; Advisory Board, Tiziana Life Sciences;
Shuchi K. Rodgers, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Geoffrey E. Wile, MD, Nashville, TN (*Abstract Co-Author*) Nothing to Disclose
Aya Kamaya, MD, Stanford, CA (*Abstract Co-Author*) Royalties, Reed Elsevier; Researcher, Koninklijke Philips NV; Researcher, Siemens AG
Alexandra Medellin, MD, Calgary, AB (*Abstract Co-Author*) Nothing to Disclose
Lisa Finch, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Stephanie R. Wilson, MD, Calgary, AB (*Abstract Co-Author*) Equipment support, Koninklijke Philips NV; Equipment support, Siemens AG; Equipment support, Samsung Electronics Co, Ltd; Research support, LANDAUER, Inc; Research support, Samsung Electronics Co, Ltd; Speakers Bureau, Koninklijke Philips NV

PURPOSE

The American College of Radiology Contrast-Enhanced Ultrasound Liver Imaging Reporting and Data System (CEUS LI-RADS) is developed to classify focal liver observations in patients at risk of HCC. The aim of this prospective multicenter study is to validate the CEUS LI-RADS.

METHOD AND MATERIALS

A total of 273 nodules from 255 patients at risk of HCC are included in this ongoing study conducted at 8 centers (6 in the USA, 1 in Canada and 1 in Italy). Focal liver observations are classified as LR-5, (definitely HCC) if greater than 1 cm with arterial phase hyperenhancement, and late, mild washout. Rim enhancement and/or early washout and/or marked washout qualify as LR-M (malignant, but not specific for HCC). Other observations are classified as definitely benign (LR-1); probably benign (LR-2), intermediate malignancy probability (LR-3); probably HCC (LR-4). Tumor-in-Vein is characterized as LR-TIV. Definite HCC diagnosis on MRI, imaging follow-up or histology for MRI-indeterminate observations were used as reference standard.

RESULTS

The median focal liver observation size is 2.4cm. Of 273 nodules, 162 (59%) have confirmed diagnosis while 111 (41%) nodules remain indeterminate, currently undergoing imaging surveillance or awaiting histological confirmation. Of 162 confirmed nodules, 136 are HCC (82%), 6 (4%) other malignancies (2 ICC, 1 combined hepatocellular-cholangiocarcinoma, 3 metastasis) and 22 (14%) are benign. A total of 84 confirmed observations are characterized as LR-5 and 100% of them are HCC. The sensitivity of LR-5 for HCC is 63%. All 14 LR-1 and LR-2 observations are benign. All 11 LR-M observations are malignant (5 HCC, 4 metastasis, 2 ICC). 67% (14/21) of LR-3 observations and 92% (24/26) of LR-4 observations are HCC. 5% of nodules are not characterized on CEUS (LR-NC)

CONCLUSION

The CEUS LR-5 classification is 100% specific for HCC, confirming high clinical value of CEUS for noninvasive HCC diagnosis.

CLINICAL RELEVANCE/APPLICATION

Contrast-enhanced ultrasound is a reliable method of focal liver observations classification in patients at risk for HCC

Printed on: 10/29/20

SSA08

Gastrointestinal (Radiomics)

Sunday, Dec. 1 10:45AM - 12:15PM Room: S104A

AI CT GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Bachir Taouli, MD, New York, NY (*Moderator*) Research Grant, Bayer AG; Research Grant, Takeda Pharmaceutical Company Limited; Research Grant, Regeneron Pharmaceuticals, Inc; Consultant, Alexion Pharmaceuticals, Inc; Consultant, Bayer AG; ;
Aliya Qayyum, MD,MBBS, Houston, TX (*Moderator*) Nothing to Disclose
Achille Mileto, MD, Seattle, WA (*Moderator*) Research grant, General Electric Company;

For information about this presentation, contact:

aqayyum@mdanderson.org

Sub-Events

SSA08-01 MRI Radiomics Features Predict Immuno-oncological Characteristics and Recurrence of Hepatocellular Carcinoma

Sunday, Dec. 1 10:45AM - 10:55AM Room: S104A

Participants
Stefanie Hectors, PhD, New York, NY (*Presenter*) Nothing to Disclose
Sara Lewis, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Cecilia Besa, MD, Santiago, Chile (*Abstract Co-Author*) Nothing to Disclose
Michael J. King, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Daniela Said, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Juan Putra, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Stephen Ward, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Takaaki Higashi, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Swan Thung, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Shen Yao, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Ilaria Laface, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Myron Schwartz, New York, NY (*Abstract Co-Author*) Advisory Board, Bayer AG Advisory Board, Onyx Pharmaceuticals, Inc
Sacha Gnjatic, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Miriam Merad, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Yujin Hoshida, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Bachir Taouli, MD, New York, NY (*Abstract Co-Author*) Research Grant, Bayer AG; Research Grant, Takeda Pharmaceutical Company Limited; Research Grant, Regeneron Pharmaceuticals, Inc; Consultant, Alexion Pharmaceuticals, Inc; Consultant, Bayer AG; ;

PURPOSE

To assess the value of qualitative and quantitative radiomics features measured with MRI for noninvasive prediction of histopathologic and genomics characteristics, as well as outcomes of hepatocellular carcinoma (HCC).

METHOD AND MATERIALS

This retrospective study was IRB-approved and the requirement of informed consent was waived. Forty-eight patients with HCC (M/F 35/13, mean age 60y) who underwent hepatic resection or transplant within 4 months of abdominal MRI were included. Qualitative imaging traits, quantitative non-texture related and texture features were assessed in index lesions on contrast-enhanced T1-weighted and diffusion-weighted images. Advanced histopathological analysis was performed using multiplex immunohistochemistry. Gene expression analysis was performed on paraffin-embedded tissue blocks of the index HCC lesions. The association of imaging features with histopathologic and genomics features was assessed using binary logistic regression and correlation analyses. Binary logistic regression analysis was also employed to analyze the association of radiomics, histopathologic and genomics features with radiological recurrence of HCC at 12 months.

RESULTS

Qualitative (correlation coefficient r=-0.41-0.40, P<0.042) and quantitative (r=-0.52-0.45, P<0.049) radiomics features correlated with immunohistochemical cell type markers for T-cells (CD3), macrophages (CD68), and endothelial cells (CD31). MRI radiomics features also correlated with expression of immunotherapy targets PD-L1 at protein level (r=0.41-0.47, P<0.029) as well as PD1 and CTLA4 at mRNA expression level (r=-0.48-0.47, P<0.037). Follow-up imaging data up to at least 1 year after surgery was available for 43 patients, of whom 10 patients showed HCC recurrence within 1 year after surgery. Several radiomics features showed significant association with HCC recurrence (highest AUC =0.80, odds ratio=5.51, P<0.028), while histopathologic and genomics features did not (P>0.098).

CONCLUSION

We observed significant associations of MRI radiomics features with HCC histopathological and genomics characteristics and recurrence. We are currently validating these results in a prospective study.

CLINICAL RELEVANCE/APPLICATION

Our results suggest that MRI radiomics features may serve as noninvasive predictors of HCC biological properties and recurrence, providing potentially valuable information for treatment planning.

SSA08-02 Multi-Institutional Study using Radiomics and Machine Learning Model to Differentiate Benign and Malignant Focal Hepatic Lesions on Dual-Energy CT

Sunday, Dec. 1 10:55AM - 11:05AM Room: S104A

Participants
Ramandeep Singh, MBBS, Boston, MA (*Presenter*) Nothing to Disclose
Dinesh Manoharan, MD,MBBS, Chennai, India (*Abstract Co-Author*) Nothing to Disclose
Sanjay Sharma, MD, FRCR, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Madhusudhan Kumble Seetharama, MD, FRCR, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Arjunlokesh Netaji, MBBS, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Mannudeep K. Kalra, MD, Lexington, MA (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, Riverain Technologies, LLC;
Subba R. Digumarthy, MD, Boston, MA (*Abstract Co-Author*) Speaker, Siemens AG; Research Grant, Lunit Inc; Researcher, Merck & Co, Inc; Researcher, Pfizer Inc; Researcher, Bristol-Myers Squibb Company; Researcher, Novartis AG; Researcher, F. Hoffmann-La Roche Ltd; Researcher, Polaris Pharmaceuticals, Inc; Researcher, Cascadia Healthcare, LLC; Researcher, AbbVie Inc; Researcher, Gradalis, Inc; Researcher, Clinical Bay; Researcher, Zai Lab
Fatemeh Homayounieh, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Felix Lades, Forchheim, Germany (*Abstract Co-Author*) Employee, Siemens AG
Martin U. Sedlmair, MS, Forchheim, Germany (*Abstract Co-Author*) Employee, Siemens AG
Sanjay Saini, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the application of a machine learning (ML) model-based approach for differentiating benign and malignant focal hepatic lesions on post-contrast dual energy CT (DECT) using tumor analysis and radiomics prototypes (eXamine, Siemens Healthineers).

METHOD AND MATERIALS

Our included 174 adults from the US (Site-A: 103, 65 ± 15 years, 53M:50F) and India (Site-B=71, 48 ± 17 years, 46M:25F) with benign (Site-A=60;Site-B=35) or malignant (Site-A=43;SiteB=36) focal hepatic lesions on post-contrast dual source, DECT (Site-A: Siemens Force or Flash; Site-B: Siemens Flash). Most malignant lesions had histology; benign lesions had characteristic imaging features or were stable on follow-up CT. Low and high kV images in arterial phase (2-3mm) were de-identified, exported, and processed with the TA prototype to derive iodine concentrations and uptakes as well as 585 radiomic features within each lesion's volume and rim. ML model based statistical evaluation (Site-A: Training; Site-B: Test) was performed with the radiomics prototype. Random Forest Classifier was used to calculate the accuracy (AUC) for differentiating benign and malignant hepatic lesions.

RESULTS

Multivariate logistic regression demonstrated that 31 radiomic features enabled distinction between benign and malignant lesions (AUC 0.7-0.8; p=0.0002-0.03; gldm, glszm, glrlm, glszm, first order-kurtosis). With ML model based random forest classifier 12 inner rim radiomic features enabled lesion characterization (AUC=0.82, p<0.0001) with high specificity (97%) and positive predictive value (94%). Only 1/35 benign (flash-filling hemangioma) lesions was classified as malignant lesion (false positive). Compared to radiomics, accuracy was lower for normalized and total iodine uptake (AUC= 0.7; p-0.003; outer lesion rim).

CONCLUSION

With a ML model, the DECT based tumor analysis and radiomics prototypes enable accurate differentiation of benign and malignant hepatic lesions.

CLINICAL RELEVANCE/APPLICATION

Trained ML based predictive models can be generated and integrated with clinical workflow to characterize and classify focal hepatic lesions seen on dual-energy CT.

SSA08-03 Application of Radiomic MRI Features in Differentiation of Combined Hepatocellular Cholangiocarcinoma, Cholangiocarcinoma, and Hepatocellular Carcinoma Using Machine Learning

Sunday, Dec. 1 11:05AM - 11:15AM Room: S104A

Participants
Xiaoyang Liu, MD, PhD, Toronto , ON (*Presenter*) Nothing to Disclose
Farzad Khalvati, PhD,MSc, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Khashayar Namdar, MSc,MENG, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Sandra Fischer, MD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Masoom A. Haider, MD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Kartik S. Jhaveri, MD, Mississauga, ON (*Abstract Co-Author*) Research Grant, General Electric Company; Research Grant, Bayer AG; Speaker, Siemens AG; Speaker, Bayer AG
Sara Lewis, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Bachir Taouli, MD, New York, NY (*Abstract Co-Author*) Research Grant, Bayer AG; Research Grant, Takeda Pharmaceutical Company Limited; Research Grant, Regeneron Pharmaceuticals, Inc; Consultant, Alexion Pharmaceuticals, Inc; Consultant, Bayer AG; ;

PURPOSE

Definitive morphological imaging features of combined hepatocellular-cholangiocarcinoma (cHCC-CC) have not been established. We aim to use radiomic features to predict diagnosis of cHCC-CC, cholangiocarcinoma (CC) and hepatocellular carcinoma (HCC) with machine learning.

METHOD AND MATERIALS

We conducted a retrospective review of pre-treatment gadolinium or gadoxetate disodium enhanced liver MRI performed between

2004 and 2018 in our institute for 86 patients with pathology proven cHCC-CC (n=38), CC (n=24) and HCC (n=24). Precontrast, arterial, portal venous, hepatic venous and 5 minutes delayed phases were included. Regions of interest (ROIs) were drawn around the largest diameter of the tumors, avoiding nearby normal tissues. 1370 radiomic features were extracted by standard library (PyRadiomics 2.1.2). Using Principle Component Analysis, they were fused to 20 first principle components that explain the majority of variance. These components were used in a 4-fold cross-validation by a Support Vector Machine (SVM) classifier to evaluate the performance of the predictive model for each MRI sequence using pathology diagnosis as endpoints.

RESULTS

We tested two endpoints predictions: 1. cHCC-CC vs. non cHCC-CC with the expectation of differentiating cHCC-CC from HCC and CC, given its unique pathology; 2. HCC vs. non HCC, due to the difference in management. For differentiation of cHCC-CC from HCC and CC, fused radiomic features from hepatic venous and precontrast phases demonstrated higher prediction value than other sequences, with AUC of 0.77 and 0.64 respectively. For the differentiation of HCC from cHCC-CC and CC, arterial, 5 min delayed, portal venous, and hepatic venous phases demonstrated highest prediction values, with AUC of 0.81, 0.80, 0.79, and 0.79 respectively.

CONCLUSION

cHCC-CC is a unique histological entity with treatment implications including liver transplantation due to poorer prognosis than either HCC or CC. Our results demonstrated fused MRI radiomic features in hepatic venous and precontrast phases are promising in differentiating cHCC-CC from HCC and CC. MRI of arterial and 5 min delayed phases have good predictive value to differentiate cHCC-CC and CC from HCC.

CLINICAL RELEVANCE/APPLICATION

The promising predicative value of radiomic MRI features in the differentiation of cHCC-CC, HCC and CC will help with improved preoperative imaging diagnosis and treatment planning including liver transplantation.

SSA08-04 A Radiomics Model Based on Preoperative Gadoxetic Acid-Enhanced MR Imaging for Predicting Liver Failure after Major Hepatectomy

Sunday, Dec. 1 11:15AM - 11:25AM Room: S104A

Participants
Wangshu Zhu, Guangzhou, China (*Presenter*) Nothing to Disclose
Siya Shi, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Zehong Yang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Chao Song, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Jun Shen, MD, Guagnzhou, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

zhuwsh5@mail2.sysu.edu.cn

PURPOSE

The clinical indexes are not sufficiently accurate in predicting the outcome of remnant liver function after surgery. The purpose of this study was to determine a radiomics model based on preoperative gadoxetic acid-enhanced MR imaging for predicting liver failure (LF) after major hepatectomy in cirrhotic patients with hepatocellular carcinoma (HCC).

METHOD AND MATERIALS

For this retrospective study, a radiomics-based model was developed based on 101 patients with HCC, with major liver resection between June 2012 and June 2018. Radiomic features were obtained from hepatobiliary phase of gadoxetic acid-enhanced MR images. The radiomics signature was built by using the least absolute shrinkage and selection operator method and multivariable logistic regression model was adopted to establish a radiomics nomogram. Nomogram performance for predicting liver failure was determined using its receiver operating characteristics curve, calibration curve and decision curve.

RESULTS

The radiomics signature, with radiomics score calculated consisting of 5 radiomics features, achieved favorable performance for predicting LF. The radiomics nomogram, which incorporated the radiomics signature and indocyanine green clearance rate at 15 minutes (ICG-R15), showed the highest performance for predicting liver failure (area under the curve [AUC],0.894; 95% confidence intervals [CI], 0.823-0.964). The integrated discrimination improvement (IDI) analysis showed a significant improvement in the accuracy of LF prediction, especially when radiomics signature was added to the clinical prediction model (IDI = 0.117, P = 0.002).

CONCLUSION

A radiomics-based model of preoperative gadoxetic acid-enhanced MR images can be used for liver failure in cirrhotic patients with HCC after major liver resection.

CLINICAL RELEVANCE/APPLICATION

A radiomics-based model in predicting liver failure after major hepatectomy

SSA08-05 Radiomic Analysis for Preoperative T-Staging in Patients with Rectal Cancer

Sunday, Dec. 1 11:25AM - 11:35AM Room: S104A

Participants
Wei Lu, Ningbo, China (*Presenter*) Nothing to Disclose
Pengfei Yang, Hangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Hailan Zheng, Taizhou, China (*Abstract Co-Author*) Nothing to Disclose
Jihong Sun, MD, PhD, Hangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Tianye Niu, PhD, Hangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Yinhua Jin, Ningbo, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

luwei19@ucas.ac.cn

PURPOSE

The accurate preoperative assessment of tumor stage is critical for treatment and prognosis of rectal cancer. This study was aimed at constructing a radiomic prediction model to preoperatively assess the primary tumor (T) stage accurately in patients with rectal cancer.

METHOD AND MATERIALS

The magnetic resonance imaging (MRI) data of 349 patients with rectal cancer were collected from February 2011 to October 2017 in this study (T1, n=49; T2, n=79; T3, n=157; T4, n=64). The patients were divided randomly into training cohort (n=240) and validation cohort (n=109). The radiomic features were extracted from high-resolution T2-weighted imaging (HR-T2WI) and diffusion-weighted imaging (DWI) data, then selected to compose radiomic signatures. Incorporating the radiomic signatures and clinical independent risk factors, we constructed a radiomic assessment model by artificial neural network (ANN). The calibration, discrimination, and clinical utility of the radiomic models were assessed by independent validation.

RESULTS

The radiomic signature was significantly related to T stage of rectal cancer ($p<0.01$), and showed good preoperatively T-staging performance. The area under the curve (AUC) was 0.822, 0.733 and 0.779 in discriminating between early stages (T1 and T2 stage, T1/2) and advanced stages (T3 and T4 stage, T3/4), between T1 and T2 stages, and between T3 and T4 stages, respectively. Moreover, with combination of the raidomic signature and clinical independent risk factors, the raidiomic assessment models showed improved performance. The AUC was 0.858, 0.801 and 0.815 discriminating between T1/2 and T3/4 stages, between T1 and T2 stages, and between T3 and T4 stages, respectively. And the performance was confirmed in an independent validation cohort (AUC, 0.842, 0.773 and 0.730).

CONCLUSION

The radiomic model has an excellent performance in preoperative assessment of T stage of rectal cancer. It can improve the accuracy of T staging in patients with rectal cancer.

CLINICAL RELEVANCE/APPLICATION

The radiomic prediction model can improve the accuracy of T-staging assessment in patients with rectal cancer.

SSA08-06 Radiomics Signature on Multiparametric MRI: Association with Disease-free Survival in Patients with Locally Advanced Rectal Cancer

Sunday, Dec. 1 11:35AM - 11:45AM Room: S104A

Participants
Yanfen Cui, Taiyuan, China (*Presenter*) Nothing to Disclose
Xiaotang Yang, Taiyuan, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yanfen210@126.com

PURPOSE

To develop a radiomics signature based on pre-treatment multiparameter MRI features to estimate disease-free survival (DFS) in patients with locally advanced rectal cancer (LARC) after receiving neoadjuvant chemoradiotherapy (CRT) and to establish a radiomics nomogram incorporating the radiomics signature and clinicopathological findings.

METHOD AND MATERIALS

142 consecutive patients with LARC (training: validation cohorts = 71:71) were enrolled in our retrospective study. 1188 imaging features were extracted from pre-CRT T2WI, contrast enhanced T1WI, and ADC images for each patient. Least absolute shrinkage and selection operator (LASSO) Cox regression was performed to select key features and build a radiomics signature in the training set, and the cutoff point of the radiomics signature to divide the patients into high- and low-risk groups was determined using ROC curve analysis. Kaplan-Meier analysis was used to determine the association of the radiomics signature and DFS. Combining clinicopathological factors, a radiomics nomogram was constructed to validate the radiomic signatures for individualized DFS estimation. Nomogram discrimination and calibration were evaluated.

RESULTS

Higher Rad-scores were significantly associated with worse DFS in both the training and validation cohorts (both $P< 0.05$). The radiomics nomogram, incorporating the radiomics signature and ypN, tumor differentiation, and MRF, estimated DFS (C-index, 0.715; 95% confidence interval [CI], 0.67-0.79) better than the clinicopathological or Rad-score-only nomograms.

CONCLUSION

This study demonstrated that the radiomics signature is an independent biomarker for the estimation of DFS in patients with LARC. Combining the radiomics nomogram improved individualized DFS estimation.

CLINICAL RELEVANCE/APPLICATION

radiomics signature is an independent biomarker for the estimation of DFS in patients with LARC

SSA08-07 Reproducibility of Radiomics Features Using Single-Energy Dual-Source CT: Influence of Radiation Dose and CT Reconstruction Settings Within the Same Patient

Sunday, Dec. 1 11:45AM - 11:55AM Room: S104A

Participants

Mathias Meyer, Mannheim, Germany (*Presenter*) Researcher, Siemens AG; Researcher, Bracco Group
James S. Ronald, MD, PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Federica Vernuccio, MD, Palermo, Italy (*Abstract Co-Author*) Nothing to Disclose
Rendon C. Nelson, MD, Durham, NC (*Abstract Co-Author*) Consultant, VoxelMetrix, LLC; Co-owner, VoxelMetrix, LLC; Advisory Board, Bracco Group; Advisory Board, Guerbet SA; Speakers Bureau, Bracco Group; Royalties, Wolters Kluwer nv
Juan Carlos Ramirez-Giraldo, PhD, Cary, NC (*Abstract Co-Author*) Employee, Siemens AG
Justin B. Solomon, PhD, Durham, NC (*Abstract Co-Author*) License agreement, Sun Nuclear Corporation License agreement, 12 Sigma Technologies
Bhavik N. Patel, MD, Fremont, CA (*Abstract Co-Author*) Speakers Bureau, General Electric Company; Research Grant, General Electric Company
Ehsan Samei, PhD, Durham, NC (*Abstract Co-Author*) Research Grant, General Electric Company Research Grant, Siemens AG Advisory Board, medInt Holdings, LLC License agreement, 12 Sigma Technologies License agreement, Gammex, Inc
Daniele Marin, MD, Durham, NC (*Abstract Co-Author*) Research support, General Electric Company

PURPOSE

To investigate the impact of radiation dose and reconstruction CT settings on the reproducibility of radiomic features within the same patient, as well as to identify correction factors for mitigating these sources of variability.

METHOD AND MATERIALS

This is a retrospective study of 78 patients (33 women [mean age, 61 years; age range, 28-74 years] and 55 men [mean age, 60 years; age range, 34-81 years] with 151 metastatic liver lesions who underwent a single-energy dual-source contrast-enhanced dose split staging CT. By using the imaging raw datasets technique parameters were altered, resulting in 28 different CT datasets per patient which included different dose level, section thickness, kernel and reconstruction algorithms settings. Using a training dataset, reproducible intensity, shape and texture RFs (r2>0.95) were selected and correction factors were calculated by using a linear model to convert each RF to its estimated value under the reference technique. Using a test dataset, reproducibility of hierarchical clustering based on RFs measured under different CT techniques was assessed.

RESULTS

The percentage of RFs deemed reproducible for any variation of the different technical parameters was 11% (12/106). RFs in the shape category were the least likely to be affected by variability due to changes in technical parameters (87.5% [14/16]). Of all technical parameters, reconstructed section thickness had the largest impact on the reproducibility of RFs (12.3% [13/106]). The results of the hierarchical cluster analysis, showed improved clustering reproducibility when reproducible RFs without and with dedicated correction factors (Prob=0.62-1.0) where used.

CONCLUSION

Our patient study confirmed that many RFs are highly affected by CT acquisition and reconstruction settings to the point of being non-reproducible. By selecting reproducible RFs along with dedicated correction factors a significant improvement in the clustering reproducibility of RFs could be achieved.

CLINICAL RELEVANCE/APPLICATION

Radiomic features of databases with heterogenous CT radiation dose and reconstruction settings are largely non-reproduceable and thus, may be limited in their use for prognostic clinical studies.

SSA08-08 Prediction and Measurement of Treatment Response in Metastatic Liver Disease with Machine Learning Radiomics

Sunday, Dec. 1 11:55AM - 12:05PM Room: S104A

Participants
Leila Mostafavi, MD, MBA, Boston, MA (*Presenter*) Nothing to Disclose
Fatemeh Homayounieh, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Subba R. Digumarthy, MD, Boston, MA (*Abstract Co-Author*) Speaker, Siemens AG; Research Grant, Lunit Inc; Researcher, Merck & Co, Inc; Researcher, Pfizer Inc; Researcher, Bristol-Myers Squibb Company; Researcher, Novartis AG; Researcher, F. Hoffmann-La Roche Ltd; Researcher, Polaris Pharmaceuticals, Inc; Researcher, Cascadia Healthcare, LLC; Researcher, AbbVie Inc; Researcher, Gradalis, Inc; Researcher, Clinical Bay; Researcher, Zai Lab
Felix Lades, Forchheim, Germany (*Abstract Co-Author*) Employee, Siemens AG
Gina Basinsky, BS, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Gordon J. Harris, PhD, Boston, MA (*Abstract Co-Author*) Medical Advisory Board, Fovia, Inc; Member, IQ Medical Imaging LLC; Member, Novometrics, LLC; ;
Mannudeep K. Kalra, MD, Lexington, MA (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, Riverain Technologies, LLC;

For information about this presentation, contact:

lmostafavi@mgh.harvard.edu

PURPOSE

To assess if machine learning (ML) based-radiomics can predict and measure treatment response in patients with metastatic liver disease in patients with breast cancer.

METHOD AND MATERIALS

Our IRB approved study included 98 adult women (mean age 54±11 years) with metastatic liver disease from breast cancer. All patients underwent contrast abdomen-pelvis CT in portal venous phase at two timepoints - baseline (BL: pre-treatment) and follow-up (FU: between 3-12 months following treatment). Patients were subcategorized into three subgroups based on RECIST 1.1. criteria (Response Evaluation Criteria in Solid Tumors version 1.1): 32 with stable disease (SD), 32 with partial response (PR) and 34 with progressive disease (PD) on follow up CT. CT images from BL and FU were deidentified and exported to radiomics prototype (eXamine, Siemens Healthineers). The prototype enabled semiautomatic segmentation of the target liver lesions for extraction of first and high order radiomics. Statistical analyses with logistic regression and random forest classifiers was performed with the prototype to assess how well BL radiomics predicts treatment response, and whether radiomics can differentiate SD from

PD and PR on the two timepoints.

RESULTS

BL radiomics differentiated SD from PR (AUC 0.718) and also SD from PD (AUC 0.797). There was no significant difference between the radiomics on BL and FU CT images of patients with SD (P= 0.998). Busyness (an NGTDM feature) and surface volume ratio (a shape feature) were the most powerful predictors of PD between the BL and FU exams (AUC 0.892). BL and FU radiomics were strong measures of PR (AUC 0.938; p= 0.026 with multivariate logistic regression) and random forest classification (AUC 0.78).

CONCLUSION

Radiomics can predict and measure treatment response in patients with metastatic liver disease.

CLINICAL RELEVANCE/APPLICATION

Machine-learning based radiomics has promise to help predict and differentiate stable metastatic liver disease from progressive disease and partial response to treatment.

SSA08-09 Preoperative Prediction of Early Recurrence in Advanced Gastric Cancer: A Radiomic Model Using Computed Tomography

Sunday, Dec. 1 12:05PM - 12:15PM Room: S104A

Participants
Wenjuan Zhang, Lanzhou, China (*Presenter*) Nothing to Disclose
Mengjie Fang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Junlin Zhou, Lanzhou, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

hxzhangwj121@163.com

PURPOSE

In the clinical management of advanced gastric cancer (AGC), preoperative identification of early recurrence after curative resection is essential. Thus, we aimed to create a Radiomic Model Using Computed Tomography to predict early recurrence in AGC patients preoperatively.

METHOD AND MATERIALS

Ethical approval was obtained for this retrospective analysis, and the informed consent requirement was waived. This study enrolled 521 consecutive patients (302 in the training set and 219 in the test set) with clinicopathologically confirmed AGC from our center. Radiomic features were extracted from preoperative diagnostic CT images. Machine learning methods were applied to shrink feature size and build a predictive radiomic signature. We incorporated the radiomic signature and clinical risk factors into a nomogram using multivariable logistic regression analysis. The area under the curve (AUC) of operating characteristics (ROC) and accuracy were assessed to evaluate the nomogram's performance in discriminating early recurrence.

RESULTS

A radiomic signature, including two hand crafted features and one deep learning feature, was significantly associated with early recurrence (p-value<0.0001 for both sets). The radiomic signature showed a good performance for discriminating early recurrence with AUCs of 0.820 (95% CI, 0.772-0.869) in the training set and 0.799 (95% CI, 0.741-0.857) in the test set. In addition, clinical N stage, clinical T stage, and carcinoembryonic antigen levels were considered independent predictors for early recurrence. The nomogram, combining all these predictors, showed powerful prognostic ability in both the training and test sets with AUCs of 0.851 (95% CI, 0.807-0.895) and 0.842 (95% CI, 0.791-0.894), respectively. The predicted risk yielded good agreement with the observed recurrence probability.

CONCLUSION

By incorporating a radiomic signature and clinical risk factors, we created a radiomic nomogram to predict early recurrence in patients with AGC, preoperatively, which may serve as a potential tool to guide personalized treatment.

CLINICAL RELEVANCE/APPLICATION

radiomic nomogram may improve risk stratification and serve as a potential biomarker for guiding individual care in patients with AGC.

SSA09

Gastrointestinal (Rectal Cancer)

Sunday, Dec. 1 10:45AM - 12:15PM Room: S103CD

GI MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
David D. Bates, MD, Hastings On Hudson, NY (*Moderator*) Research support, General Electric Company
Viktoriya Paroder, MD,PhD, Bronx, NY (*Moderator*) Nothing to Disclose
Andrea Laghi, MD, Rome, Italy (*Moderator*) Speaker, General Electric Company; Speaker, Guerbet SA; Speaker, Bayer AG; Speaker, Bracco Group; Speaker, Merck & Co, Inc
Myles T. Taffel, MD, New York City, NY (*Moderator*) Nothing to Disclose

Sub-Events

SSA09-02 Radiomic Shape Descriptors of Rectal Wall and Lumen on MRI are Associated with Low and High Pathologic Tumor Stages After Chemoradiation for Rectal Cancer

Sunday, Dec. 1 10:55AM - 11:05AM Room: S103CD

Participants
Charlems Alvarez-Jimenez, MSc, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Jacob T. Antunes, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Amrish Selvam, Naperville, IL (*Abstract Co-Author*) Nothing to Disclose
Kaustav Bera, MBBS, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Justin T. Brady, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Sharon Stein, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Kenneth Friedman, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Eduardo Romero, MD,PhD, Bogota, Colombia (*Abstract Co-Author*) Nothing to Disclose
Anant Madabhushi, PhD, Cleveland, OH (*Abstract Co-Author*) Stockholder, Elucid Bioimaging Inc; Stockholder, Inspirata Inc; Consultant, Inspirata Inc; Scientific Advisory Board, Inspirata Inc; Scientific Advisory Board, AstraZeneca PLC; Scientific Advisory Board, Merck & Co, Inc; Researcher, Koninklijke Philips NV; Researcher, Inspirata Inc; License agreement, Elucid Bioimaging Inc; License agreement, Inspirata Inc; Grant, PathCore Inc; Grant, Inspirata Inc
Jaykrishna Gollamudi, MD, Beechwood, OH (*Abstract Co-Author*) Nothing to Disclose
Rajmohan Paspulati, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Andrei S. Purysko, MD, Westlake, OH (*Abstract Co-Author*) Nothing to Disclose
Satish Viswanath, Cleveland, OH (*Presenter*) Scientific Advisory Board, Virbio Inc

For information about this presentation, contact:

cxa220@case.edu

PURPOSE

The relatively poor expert restaging accuracy of MRI in rectal cancer after chemoradiation (sensitivity ~53%) may be due to difficulties in visual assessment of residual tumor. However, both the rectal wall and lumen may distort in shape due to tumor impact. While previous studies have examined radiomic appearance (texture) of rectal tumors on MRI, we evaluated whether radiomic shape features of the entire rectal wall and the lumen are associated with pathologic tumor stage after chemoradiation therapy (CRT).

METHOD AND MATERIALS

60 patients were retrospectively identified across 2 sites, from whom an axial 3T T2W MRI was available after standard-of-care chemoradiation but prior to excision surgery. The entire rectal wall (ERW) and the lumen were annotated by an expert radiologist on all MRIs. 96 shape descriptors (2D and 3D) were extracted from each of lumen and ERW separately, for each patient. Top 2 ranked radiomic shape features associated with pathologic tumor stage (evaluated on excised specimens) were identified via cross-validation on a training subset from Site 1 (n=33). These were evaluated using discriminant analysis on a hold-out validation set of 27 patients (n=13 from Site 1, n=14 from Site 2).

RESULTS

Top-ranked radiomic shape descriptors for distinguishing low (ypT0-2) and high (ypT3-4) stages after CRT were 2D shape change in ERW across rectal volume (p=0.0004) and 3D volumetric roundness of the lumen (p=0.0014). These features resulted in an AUC of 0.82 in the training set (n=33), and an AUC of 0.82 on hold-out validation (n=27, 2 sites). By contrast, ERW volume (p=0.0357) and lumen volume (p=0.8431) were not significantly different or discriminatory between pathologic stages in either cohort.

CONCLUSION

Radiomic shape features of the entire rectal wall and lumen are highly relevant for discriminating patients with low and high tumor stage after chemoradiation, likely capturing implicit effects of residual tumor expanding or contracting the rectum.

CLINICAL RELEVANCE/APPLICATION

First study of radiomic shape features of rectal structures on post-chemoradiation MRI reveal physiologically intuitive differences in low and high pathologic tumor stages, and could enable better evaluation of rectal cancer response to neoadjuvant CRT.

SSA09-03 Diagnostic Accuracy of Magnetic Resonance Tumor Regression Grade for Pathological Complete Response in Rectal Cancer Treated with Neoadjuvant Chemoradiotherapy: A Systematic Review and Meta-Analysis

Sunday, Dec. 1 11:05AM - 11:15AM Room: S103CD

Participants
Jong Keon Jang, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Sang Hyun Choi, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seong Ho Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Research Grant, Central Medical Service Co, Ltd
Kyung Won Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyun Jin Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ah Young Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

edwardchoi83@gmail.com

PURPOSE

We aimed to systematically evaluate and determine the diagnostic accuracy of the magnetic resonance tumor regression grade (mrTRG) for diagnosing pathological complete response (pCR) and pathological T1 or lower than T1 stage (<=ypT1) in rectal cancer patients treated with neoadjuvant chemoradiotherapy (CRT), with a focus on the selection of candidates for less aggressive treatments such as local excision or watch and wait approaches.

METHOD AND MATERIALS

Original studies that investigated the correlation of mrTRG with pathological tumor regression grade and pathological T stage were identified in MEDLINE and EMBASE up until August 31, 2018 according to PRISMA guidelines. The search terms included colorectal cancer, chemoradiation therapy, magnetic resonance imaging, and response or regression. A bivariate random effects model was used to for statistical analysis.

RESULTS

Six studies with 916 patients were included. The meta-analytic summary sensitivity and specificity of mrTRG 1 for pCR were 32.3% (95% CI, 18.2-50.6%) and 93.5% (95% CI, 91.5-95.1%) (Fig. 1A), while for <=ypT1 they were 31.8% (95% CI, 16.2-53.0%) and 94.7% (95% CI, 91.9-96.5%) (Fig.1B). On the contrary, sensitivity and specificity of mrTRG 1 or 2 for pCR were 69.9% (95% CI, 60.2-78.1%) and 62.2% (95% CI, 56.2-67.8%), while those for <=ypT1 were 71.4% (95% CI, 61.6-79.6%) and 67.7% (95% CI, 59.8-74.7%).

CONCLUSION

mrTRG 1 showed high specificity for pCR and <=ypT1, but suboptimal sensitivity. mrTRG 1 or 2 showed higher sensitivity for pCR and <=ypT1, but lower specificity. Because of the suboptimal sensitivity of mrTRG 1, it might be limited as a criterion for organ preservation after CRT.

CLINICAL RELEVANCE/APPLICATION

Good response of mrTRGs may be a limited criterion for diagnosing pCR or selecting patients for local excision or watch and wait approaches.

SSA09-04 Locally Advanced Rectal Cancer: The Value of Intravoxel Incoherent Motion Imaging and Diffusion Kurtosis Imaging in Evaluating Pathological Complete Response to Neoadjuvant Chemoradiotherapy

Sunday, Dec. 1 11:15AM - 11:25AM Room: S103CD

Participants
Lanqing Yang, Chengdu, China (*Presenter*) Nothing to Disclose
Bing Wu, MD, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose
Xiaoxin Liu, Yinchuan, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

lqyang95@163.com

PURPOSE

To investigate the role of intravoxel incoherent motion diffusion-weighted imaging (IVIM) and diffusion kurtosis imaging (DKI) in evaluating pathological complete response (pCR) to neoadjuvant chemoradiotherapy (CRT) in locally advanced rectal cancer (LARC).

METHOD AND MATERIALS

42 LARC patients (cT3/4 or N+) were consecutively enrolled in this prospective study, and underwent pre- and post-CRT rectal MRI on a 3.0 T MRI scanner, including IVIM and DKI sequences with 12 b values. They all received neoadjuvant CRT and subsequent surgery. Pathological tumor regression grade (TRG) of the surgical specimen served as the reference standard. Patients were divided into pCR (TRG0) and non-pCR group (TRG1-3). Slow diffusion coefficient (D) (.10-3 mm2/s), fast diffusion coefficient (D*) (.10-3 mm2/s), perfusion-related diffusion fraction (f), mean kurtosis (MK), mean diffusion (MD) (.10-3 mm2/s) and monoexponential ADC value (.10-3 mm2/s) were calculated by manually drawing ROIs on three representative slices of primary and residual tumor on pre- and post-CRT b=800 s/mm2 images. ROIs were then copied to images of IVIM and DKI parameters. Independent t test, Mann-Whitney U test, and ROC curves were used for statistical analyses.

RESULTS

The pCR group (n=7) had a significant higher post-CRT f (P=0.012), D*(P=0.027), MD (P=0.005) and ADC value (P=0.016) than non-pCR group (n=35). Also the percentage changes of f (P=0.034), MD (P=0.043) and ADC value (P=0.030) after CRT were significant higher in the pCR group. ROC curves showed that post-CRT f, D*, MD and ADC value presented AUCs of 0.739, 0.722, 0.788, and 0.767 in selecting pCR, and the post-CRT MD had a higher sensitivity (82.9% vs. 77.1%) and similar specificity (both 85.7%) than ADC value. Besides, percentage changes of f, MD, and ADC value after treatment presented AUCs of 0.755, 0.747, and 0.735 in identifying pCR, and the percentage f had a higher specificity (85.7% vs. 71.4%) and lower sensitivity(71.4% vs. 80%) than ADC value.

CONCLUSION

IVIM and DKI parameters, especially MD and f could help to differentiate pCR from non-pCR after nCRT in LARC.

CLINICAL RELEVANCE/APPLICATION

IVIM and DKI could help to more reliably select pCR in patients with LARC after CRT, thus could help individualized treatment in clinical. Complere responders may receive non-operative treatment instead of radical resection with reduced surgery related morbidities and improved life quality.

SSA09-05 The Additional Value of Post-nCRT MRI Characteristics for Predicting Locally Advanced Rectal Cancer Patients 3-year DFS

Sunday, Dec. 1 11:25AM - 11:35AM Room: S103CD

Participants
Yankai Meng, Beijing , China (*Presenter*) Nothing to Disclose
Chen Wang, MMed, Xuzhou, China (*Abstract Co-Author*) Nothing to Disclose
Pei P. Dou, Xuzhou , China (*Abstract Co-Author*) Nothing to Disclose
Hongmei Zhang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Kai Xu, MD, PhD, Xuzhou, China (*Abstract Co-Author*) Nothing to Disclose
Chunwu Zhou, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

mengyankai@126.com

PURPOSE

The aim of this study was to investigate the additional value of post-nCRT MRI characteristics for predicting locally advanced rectal cancer patients 3-year DFS.

METHOD AND MATERIALS

In this retrospective study, pre- and post-neoadjuvant chemoradiotherapy (nCRT) MRI morphologic (e.g. pre-nCRT MRI-detected extramural venous invasion) and clinicopathologic variabilities (e.g. pathological complete response) were evaluated in all patients. 3-year DFS was estimated using Kaplan-Meier product-limit method, and Cox proportional hazards models were used to determine associations between morphologic or clinicopathologic variabilities and survival outcomes.

RESULTS

A total of 171 patients (median age of 55 years; age range, 27-82 years) were included in the study. 137 (80.1%) patients performed both pre- and post-nCRT MRI examination, while 34 (19.9%) patients did not perform post-nCRT MRI. Pathological type of tumor was an independent predictor for 3-year survival on pathologic variables. In univariate and multivariate analysis, non-adenocarcinoma was a significant factor for worse long-term survival outcomes with the DFS of 38.0 months (95% CI 25.1-51.0 months, P=0.022) in univariate and with the HR of 3.155 (95% CI 1.160-8.586) in multivariate analysis (P=0.024). Other pathologic characteristics subgroup (vascular tumor thrombus, dentate line involvement, CRM involvement and KRAS gene mutation) showed worse DFS compared to reference subgroup in Kaplan-Meier univariate analysis, but the difference were not significant in COX analysis.The 3-year DFS of patients with positive mrEMVI were 52.6 months in univariate analysis, while the negative patients were 65.1 months (P=0.003). Multivariate analysis result was not significantly different (P=0.563), but the HR in mrEMVI positivity patients was 1.270 .In univariate analysis, mrTRG was the independent predictor for 3-year survival on post-nCRT MRI variables (P=0.011) . Partial response patients showed worse DFS compared to those with complete response (HR=2.809, 95% CI 0.451-17.496), but the difference was not significant (P=0.268).

CONCLUSION

Pathological type was the independent risk factor for long-term outcomes in LARC patients; while the other morphologic and clinicopathologic characteristics were not significantly related to survival.

CLINICAL RELEVANCE/APPLICATION

Pre- and post-nCRT MRI characteristics provide more individualieze predicting information for LARC patients outcomes.

SSA09-06 MRI in Restaging Locally Advanced Rectal Cancer: Detailed Reasons of Discrepancy when Taking Pathology as Standard of Reference

Sunday, Dec. 1 11:35AM - 11:45AM Room: S103CD

Participants
Xiaoxuan Jia, MA, Beijing, China (*Presenter*) Nothing to Disclose
Yinli Zhang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yi Wang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Caizhen Feng, MBChB, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Danhua Shen, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yingjiang Ye, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Nan Hong, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jiaxiaoxuanfs@163.com

PURPOSE

To analyze the detailed reasons of discrepancy between restaging MRI and pathology in comprehensive morphologic indicators of tumor response

METHOD AND MATERIALS

The MRI and pathological data of 57 consecutive patients who received neoadjuvant treatment and curative surgery from August 2015 to July 2018 were prospectively collected and retrospectively analyzed. The sensitivity and specificity of restaging MRI in detecting tumor regression grade (TRG), T, N stage, circumferential resection margin (CRM), extramural vascular invasion (EMVI) were calculated when taking pathology as reference. One-by-one comparison between restaging MRI and pathology was conducted to analyze the detailed reasons of discrepancy.

RESULTS

The sensitivity of restaging MRI in detecting TRG3-5, T3-4, N+, CRM involvement and EMVI was 77.1%, 100.0%, 75.0%, 87.5% and 91.7%, respectively. Whereas the specificity was 72.7%, 62.5%, 70.7%, 85.7% and 64.4%, respectively. Perirectal irregular spiculation of fibrosis caused overstaging of T2 disease. Extramural infiltration depth of residual tumor in fibrotic area was not accurately identified, therefore accurate T3 staging was not obtained. Massive fibrosis mixed with tumor-like signal could stretch mesorectal fasica or adjacent organs, and be evaluated as persistent CRM involvement or T4b disease. Fibrosis could manifest as similar shape and signal intensity to invaded vessels shrinked after treatment, resulted in the overstaging of EMVI. Inflammatory cell infiltration in fibrotic area could demonstrate as high signal intensity on DWI, which was similar to residual tumor and resulted in the omission of pCR. Acellular mucin scattered in massive fibrosis could manifest as residual tumor. Edematous mucosa and submucosa, and muscularis propria could also be mistaken as residual tumor for the intermediate signal intensity on T2 weighted images.

CONCLUSION

MRI was prone to overstage the residual tumor. The discrepancy between MRI and pathology was mostly caused by the misinterpretation of fibrosis. Inflammation cell infiltration, acellular mucin, edematous mucosa and submucosa, and muscularis propria could also be mistaken as residual tumor.

CLINICAL RELEVANCE/APPLICATION

Preoperative prediction of tumor response is essential for treatment decision. Identification of what MRI features lead to misinterpretation could help improve selection of good responders.

SSA09-07 CT-derived Radiogenomic Signatures Predicting BRAF/KRAS Mutations and Overall Survival in Primary Colorectal Carcinoma Patients

Sunday, Dec. 1 11:45AM - 11:55AM Room: S103CD

Participants
Amy D. Metry, MD, Cairo, Egypt (*Presenter*) Nothing to Disclose
Tagwa Idris, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Nabil A. Elshafeey, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ly Nguyen, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ganiraju Manyam, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Meiyue Hong, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Jeniffer S. Davis, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Zhiqin Jiang, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
David Menter, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Jeffrey Morris, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
David Hong, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Scott Kopetz, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Rivka R. Colen, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

rrcolen@gmail.com

PURPOSE

To determine the ability of CT-derived radiogenomic signatures/models to predict between key mutation (BRAF/KRAS/other wild-type {WT}) of primary colorectal carcinoma (CRC) patients and their overall survival (OS).

METHOD AND MATERIALS

In this retrospective study, we evaluated 134 histopathological proven CRC patients with known genomic data, and available treatment naïve contrast-enhanced CT scans. Using 3D slicer, the entire primary tumor was semi-automatically segmented on the porto-venous phase, and the volume of interest (VOI) was extracted; subsequently, the VOI was imported into our in-house pipeline radiomic analysis to obtain 610 radiomic features per volume. For feature selection, classification model and validation, the least absolute shrinkage selection operator regression (LASSO), Xgboost, and leave-one-out-cross-validation were used, respectively.

RESULTS

Of 134 patients (male, 66; female, 68; average age, 57.9 years) with BRAF (N=47), KRAS (N=46), and WT (N=41); for mutation status, top 55 LASSO features were able to stratify the CRC patients, with an accuracy (99.3%), area under the curve (99.88%-100%), and *P*-value (2.2e-16). For overall survival 40 LASSO features were able to predict good versus poor OS (30 months), with sensitivity, specificity, and *P*-value of 100%, 97%, and 2e-16 respectively. Additional subgroup analysis revealed the ability of only 10 LASSO features to predict OS for BRAF, KRAS and WT with *P*-value of 3.049e-9, 9.19e-11, and 2.87e-7.

CONCLUSION

Our radiogenomic signatures were able robustly to stratify the CRC patients based on their molecular data, and to predict their OS status using pre-treatment CT scans.

CLINICAL RELEVANCE/APPLICATION

Radiogenomics is an emerging field that lends a non-invasive tool for quick CRC patients stratification based on their genomic/molecular profiles.

SSA09-08 Building of Comprehensive Prognostic Scoring System for Recurrence After Rectal Cancer Surgery: Based on Radiologic and Clinicopathologic Evaluation

Sunday, Dec. 1 11:55AM - 12:05PM Room: S103CD

Participants
Seo Yeon Youn, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Soon Nam Oh, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Moon Hyung Choi, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Dong Myung Yeo, Daejeon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seong-Taek Oh, Uijeongbu, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sung Eun Rha, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate risk factors of rectal cancer and develop prognostic scoring system for individual recurrence risk assessment.

METHOD AND MATERIALS

Total 489 rectal cancer patients who underwent surgery from 2009 to 2013 were included in the study. Univariate and multivariate Cox proportional hazard model were used to determinate significant prognostic factors among clinical (age, sex, clinical stage, CEA level, anastomotic leak), radiological (anal verge, tumor length, peritoneal reflection, T-, N-stage, lateral LN involvement, threatened circumferential resection margin (CRM), T3 subclassification, extramural venous invasion (EMVI), mean apparent diffusion coefficient (ADC), diffusion volumetry), and pathologic variables (pCRM, lymphatic/venous/perineural invasion, pathologic subtype, immunohistochemistry markers, T-, N-stage). Individual prognostic scores were calculated from selected significant prognostic factors. Patients were divided into low, moderate, and high risk groups according to the prognostic scores. Recurrence rates of each risk groups were obtained. Recurrence free survivals were analyzed by Kaplan-Meier method with the log-rank test.

RESULTS

Distance from anal verge, presence of EMVI on MRI; perineural invasion, N stage on pathology were selected as significant prognostic factors in multivariate analysis. Pathologic T-stage was added to these factors to build prognostic scoring system. Risk coefficient of each 5 factor was assigned as 2, 3, 3, 3, 1, respectively, according to the beta coefficient (ß = 0.52, 0.65, 0.8, 0.31, 0.89). Total 489 patients were classified as low (score 0-1, n=172), intermediate (score 2-3, n=123), and high (score 4-11, n=194) risk groups, according to individual prognostic scores (0-11). Recurrence rates of low, intermediate, and high risk groups were 7.6%, 15.5%, 36.6%, respectively ($p<0.001$). The Kaplan-Meier curve for recurrence free survival showed the prognostic differences between the 3 risk groups.

CONCLUSION

Multifactorial prognostic scoring system based on radiologic and clinicopathologic variables correlated well with recurrence rate after rectal cancer surgery and could be a comprehensive approach to evaluate the prognosis of individuals.

CLINICAL RELEVANCE/APPLICATION

New prognostic scoring system, based on radiologic, and clinicopathologic factors, is useful for comprehensive assessment of individual recurrence risk in the post-operative rectal cancer patients.

SSA09-09 Scan Time Reduction in Rectal Diffusion-Weighted Imaging: Evaluation of the Simultaneous Multislice Acceleration Technique

Sunday, Dec. 1 12:05PM - 12:15PM Room: S103CD

Participants
Jae Hyon Park, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Nieun Seo, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Joonseok Lim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jongmoon Hahm, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Myeong-Jin Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Research grant, Bayer Pharma AG; Honoraium, Guerbet SA, GE healthcare, Philips, and Siemens Healthineers

For information about this presentation, contact:

sldmsdl@yuhs.ac

PURPOSE

To assess the feasibility of simultaneous multislice-accelerated diffusion-weighted imaging (SMS-DWI) of the rectum compared to conventional DWI (C-DWI) for rectal cancer patients.

METHOD AND MATERIALS

DWI of the rectum was performed for 65 patients with initially diagnosed rectal cancer. All patients underwent C-DWI and SMS-DWI with acceleration factors of 2 and 3 (SMS2-DWI and SMS3-DWI, respectively) using a 3 T machine. Acquisition times of three DWI sequences were measured. Image quality among the three DWI sequences was reviewed by two independent radiologists using a 4-point Likert scale and subsequently compared using the Friedman test. Apparent diffusion coefficient (ADC) values for rectal cancer and normal rectal wall were compared among the three sequences using repeated measures analysis of variance.

RESULTS

Acquisition times using SMS2-DWI and SMS3-DWI were 38.2% and 55.5%, respectively, shorter than those with C-DWI. For all image quality ratings other than distortion (image sharpness, artifact, lesion conspicuity, and overall image quality), C-DWI and SMS2-DWI produced better image qualities than did SMS3-DWI ($P < 0.001$), with no significant differences observed between C-DWI and SMS2-DWI ($P >= 0.054$). ADC values of rectal cancer ($P = 0.943$) and normal rectal wall ($P = 0.360$) were not significantly different among C-DWI, SMS2-DWI, and SMS3-DWI.

CONCLUSION

SMS-DWI using an acceleration factor of 2 is feasible for rectal MRI, resulting in substantial reductions in acquisition time while maintaining diagnostic image quality and ADC values similar to those with C-DWI.

CLINICAL RELEVANCE/APPLICATION

SMS-DWI using an acceleration factor of 2 can be incorporated into routine rectal MRI protocol, with shorter scan time and similar image quality compared to conventional DWI.

Printed on: 10/29/20

GIS-SUA

Gastrointestinal Sunday Poster Discussions

Sunday, Dec. 1 12:30PM - 1:00PM Room: GI Community, Learning Center

CT GI MR OT PH OI SQ AI

AMA PRA Category 1 Credit ™: .50

FDA Discussions may include off-label uses.

Participants

Harrison Kim, PhD, MBA, Birmingham, AL (*Moderator*) Nothing to Disclose

Sub-Events

GI330-SD-SUA1 Quantitative Measurement of Hepatic Fibrosis on Gadoxetic Acid-Enhanced Magnetic Resonance Imaging in Patients with Chronic Liver Disease: Multicenter Study

Station #1

Participants

Youe Ree Kim, MD, Iksan, Korea, Republic Of (*Presenter*) Research support, Bayer AG
Dong Min Kang, MD, Iksan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Young-Hwan Lee, MD, Iksan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Tae-Hoon Kim, MD, Iksan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ji-Eon Kim, MS, Iksan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jeong Chang Won, PhD, Iksan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yong-Yeon Jeong, MD, Gwangju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Kyung Won Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Kwon-Ha Yoon, MD, PhD, Iksan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

khy1646@wku.ac.kr

PURPOSE

The aims of this study were to compare coefficient of variation (CV) in MR hepatobiliary image and serum biomarkers such as aspartate aminotransferase to platelet ratio index (APRI) and fibrosis-4 index (FIB-4) values according to the histopathologic fibrosis score, to identify the diagnostic performance of CV map in diagnosing hepatic fibrosis and to assess measurement reliability.

METHOD AND MATERIALS

This study was a prospective multicenter study which included 51 patients with 3-T liver MR imaging using gadolinium EOB DTPA and liver biopsy or surgery. Patients were divided into 4 groups according to the liver fibrosis score ; Group 1 (F0, 1), Group 2 (F2), Group 3(F3), Group 4 (F4). To quantitatively measure the hepatic fibrosis, MR hepatobiliary image was analyzed to identify inhomogeneous signal intensities calculated from CV map in the liver parenchyma. We also evaluated the comparison study of among CV, APRI and FIB-4. The diagnostic performance of the CV map for significant (>F2) and advanced (F3) fibrosis was evaluated using receiver operating characteristic (ROC) curve. Intra and interobserver agreement of CV measurement was analyzed.

RESULTS

Mean CV values in each group were Group 1 : 3.73 ± 0.21, Group 2 : 4.17 ± 0.89, Group 3 : 4.40 ± 0.82, and Group 4 : 5.22 ± 1.10, respectively (P=0.014). APRI and FIB-4 didn't show statistical significance among each group (APRI p=0.642, FIB-4 p=0.188). Area under curves of ROC were 0.828 for significant fibrosis and 0.781 for advanced fibrosis. Intra and Interobserver agreement of CV map measurement were 0.993 and 0.834.

CONCLUSION

CV value based on hepatobiliary MR image provides accurate discrimination of hepatic fibrosis with reliable measurements and demonstrates high diagnostic performance.

CLINICAL RELEVANCE/APPLICATION

MRI is commonly used to diagnose hepatocellular carcinoma and for surveillance. Hepatobiliary image can provide the information of hepatic fibrosis even if the liver biopsy is not perfomed.

GI331-SD-SUA2 Quantitative System for Assessment of Imaging Features in Chronic Pancreatitis: A Feasibility and Validation Study

Station #2

Participants

Jens Brondum Frokjer, MD, PhD, Aalborg, Denmark (*Presenter*) Nothing to Disclose
Maria Lisitskaya, Lisbon, Portugal (*Abstract Co-Author*) Nothing to Disclose
Soren Schou Olesen, Aalborg, Denmark (*Abstract Co-Author*) Nothing to Disclose
Asbjorn Mohr Drewes, MD,PhD, Aalborg, Denmark (*Abstract Co-Author*) Nothing to Disclose
Ingfrid H. Haldorsen, MD, Bergen, Norway (*Abstract Co-Author*) Nothing to Disclose

Trond Engjom, Bergen, Norway (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

In line with recent imaging guidelines and mechanistic approach for understanding chronic pancreatitis (CP), there is an unmet need for new systems for quantitative pancreatic imaging assessment. The aims were to present a new approach for assessment of imaging features in CP, to apply this system in a multi-center cohort of CP patients (feasibility study), and to report inter-reader agreement between expert radiologists (validation study).

METHOD AND MATERIALS

The feasibility study included pancreatic computed tomography (CT) or magnetic resonance imaging (MRI) from 496 patients with definitive CP in the Scandinavian Baltic Pancreatic Club (SBPC) database. Images were assessed according to the new SBPC imaging system (quantitative assessment of ductal and parenchymal features). Inter-reader agreement of reported imaging parameters was investigated for 80 CT and 80 MRI examinations by two expert radiologists.

RESULTS

Reporting of the imaging features into the imaging system was deemed feasible for >80% of CT and >90% of MRI examinations. Quantitative assessments of main pancreatic duct diameters, presence/number/diameter of calcifications, and gland diameters had high levels of inter-reader agreement with kappa-values of 0.75-0.87 and intraclass correlation coefficients of 0.74-0.97 (see Figure). The more subjective assessments, e.g. irregular main pancreatic duct and dilated side-ducts, had poor to moderate agreement with kappa-values of 0.03-0.44.

CONCLUSION

The presented system provides a feasible mean for systematic assessment of CP imaging features. Imaging parameters based on quantitative assessment, as opposed to subjective assessments, have better reproducibility and should be preferred in the development of new grading systems for understanding pathophysiology and disease progression in CP.

CLINICAL RELEVANCE/APPLICATION

Our system could support the ongoing new strategies for improved understanding and diagnosis of CP, identifying better quantitative imaging biomarkers for exploring early CP and progression of CP.

GI332-SD-SUA3 Predictive Performance of Ultrasound-Determined Non-Alcoholic Fatty Pancreas Disease Severity for Intermediate and High Coronary Heart Disease Risk

Station #3

Participants
Young Hoon An, Seoul , Korea, Republic Of (*Presenter*) Nothing to Disclose
Seong Jong Yun, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyunseok Jeong, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

zoomknight@naver.com

PURPOSE

To evaluate non-alcoholic fatty pancreas disease identified by ultrasound (US-determined NAFPD) as a risk factor for coronary heart disease (CHD), and to evaluate its predictive value for intermediate/high CHD risk, compared to US-determined non-alcoholic fatty liver disease (US-determined NAFLD) severity.

METHOD AND MATERIALS

We conducted a retrospective analysis of young adults (18- to 40-years-old) who underwent a health screening examination September, 2017 and June, 2018. NAFPD was categorized as non/mild/moderate/severe based on the echogenicity of the pancreas relative to that of the renal parenchyma. NAFLD were categorized as absent/mild/moderate/severe based on difference in echogenicity between the liver and kidney, visibility of the intrahepatic vessel walls, and of the diaphragm. CHD risk was calculated using the Framingham risk score (FRS). Spearman correlation, multivariate and receiver operating characteristic (ROC) curve analyses were used to compare predictive performance.

RESULTS

FRS increased with increasing US-determined NAFPD severity (rho=0.624, $p<0.001$), with a concomitant increase in the odds ratio for intermediate/high CHD, with an area under the ROC curve [AUC] for determining intermediate/high CHD risk in NAFLD patients of 0.687. There was no difference between the predictive performance of US-determined NAFLD or NAFPD severity with regard to intermediate/high CHD risk ($p=0.17$). The combination of US-determined NAFPD and NAFLD severity significantly improved the ability to distinguish intermediate/high CHD risk (AUC, 0.807; $p<0.001$).

CONCLUSION

US-determined NAFPD severity was well correlated with the FRS and associated with the prevalence of intermediate/high CHD risk.

CLINICAL RELEVANCE/APPLICATION

US-determined NAFPD severity combined with US-determined NAFLD severity may be useful for predicting which patients may have a higher risk of CHD.

GI333-SD-SUA4 Feasibility of Dose Modulation for Reducing Radiation Dose with Arms-Down Patient Position in Abdominopelvic Computed Tomography

Station #4

Participants
Jina Shim, RT, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Myonggeun Yoon, PHD, Seoul , Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

Yong Eun Chung, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Youngjin Lee, Incheon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Soojeng Yoon, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Joowan Hong, Gyeonggi-do , Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Soonkyu Park, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

eoeornfl@korea.ac.krsnubhro@naver.com

PURPOSE

To demonstrate for patients with arms-down position that the radiation dose can be reduced without affecting the diagnosis at abdomen computed tomography (CT).

METHOD AND MATERIALS

The control group was eight patients with arms-down position, and dose modulation-on was applied in abdomen CT Pre phase. The experimental group was twenty-three patients with arms-down position, and dose modulation-off was applied in abdomen CT Pre phase. Quantitative evaluation in two groups was compared with Hounsfield units (HU), standard deviation (SD), and signal-to-noise ratio (SNR) of liver, abdomen aorta, paraspinal musculature and subcutaneous fat. The qualitative evaluation was assessed on a scale of 5 points for overall image quality, subjective image noise, and beam hardening artifacts by comparing Pre and hepatic venous phase (HVP) only to experimental group divided into four BMI groups. Dose evaluation was compared for CT dose index (CTDI) and dose length product (DLP) by comparing Pre and HVP only to experimental group.

RESULTS

The experimental group has no significant statistical difference from the control group except for the SD of liver and HU of subcutaneous fat in HU, SD, and SNR ($p<0.05$). The Pre phase with dose modulation-off had slightly increased beam hardening artifacts and subjective image noise compared to HVP with dose modulation-on. In addition, overall image quality had slightly decreased. In the dose evaluation, the Pre phase had significantly lower CTDI and DLP compared to the HVP ($P < 0.05$).

CONCLUSION

In conclusion, our results demonstrated that dose modulation-off can reduce radiation dose for patients with arms-down position without affecting the diagnosis in abdomen CT.

CLINICAL RELEVANCE/APPLICATION

In particular, dose modulation-off can reduce radiation dose for patients with arms-down position with low weight and normal weight without affecting the diagnosis in abdomen CT.

GI378-SD-SUA5 CT-Derived Radiogenomic Signatures Predicting BRAF/KRAS Mutations and Overall Survival in Primary Colorectal Carcinoma Patients

Station #5

Participants
Amy D. Metry, MD, Cairo, Egypt (*Presenter*) Nothing to Disclose
Tagwa Idris, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Nabil A. Elshafeey, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ly Nguyen, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ganiraju Manyam, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Meiyue Hong, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Jeniffer S. Davis, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Zhiqin Jiang, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
David Menter, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Jeffrey Morris, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
David Hong, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Scott Kopetz, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Rivka R. Colen, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

rrcolen@gmail.com

PURPOSE

To determine the ability of CT-derived radiogenomic signatures/models to predict between key mutation (BRAF/KRAS/other wild-type {WT}) of primary colorectal carcinoma (CRC) patients and their overall survival (OS).

METHOD AND MATERIALS

In this retrospective study, we evaluated 134 histopathological proven CRC patients with known genomic data, and available treatment naïve contrast-enhanced CT scans. Using 3D slicer, the entire primary tumor was semi-automatically segmented on the porto-venous phase, and the volume of interest (VOI) was extracted; subsequently, the VOI was imported into our in-house pipeline radiomic analysis to obtain 610 radiomic features per volume. For feature selection, classification model and validation, the least absolute shrinkage selection operator regression (LASSO), Xgboost, and leave-one-out-cross-validation were used, respectively.

RESULTS

Of 134 patients (male, 66; female, 68; average age, 57.9 years) with BRAF (N=47), KRAS (N=46), and WT (N=41); for mutation status, top 55 LASSO features were able to stratify the CRC patients, with an accuracy (99.3%), area under the curve (99.88%-100%), and *P*-value (2.2e-16). For overall survival 40 LASSO features were able to predict good versus poor OS (30 months), with sensitivity, specificity, and *P*-value of 100%, 97%, and 2e-16 respectively. Additional subgroup analysis revealed the ability of only 10 LASSO features to predict OS for BRAF, KRAS and WT with *P*-value of 3.049e-9, 9.19e-11, and 2.87e-7.

CONCLUSION

Our radiogenomic signatures were able robustly to stratify the CRC patients based on their molecular data, and to predict their OS status using pre-treatment CT scans.

CLINICAL RELEVANCE/APPLICATION

Radiogenomics is an emerging field that lends a non-invasive tool for quick CRC patients stratification based on their genomic/molecular profiles.

GI379-SD-SUA6 Radiomics and Enhancement Ratio in Colorectal Cancer (CRC) Liver Metastases: Determination of Mutational Status

Station #6

Participants
Aliya Qayyum, MD,MBBS, Houston, TX (*Presenter*) Nothing to Disclose
Sidra J. Tayyab, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
David Fuentes, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Rebecca K. Marcus, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
A. R. Klekers, MD, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose
Rizwan Aslam, MBBCh, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Jia Sun, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Thomas A. Aloia, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

AQayyum@mdanderson.org

PURPOSE

To determine if triple-mutant (MT) versus wildtype (WT) mutation status in colorectal cancer (CRC) can be identified using CT enhancement ratios and texture analysis of liver metastases.

METHOD AND MATERIALS

We identified 39 stage 4 colorectal cancer patients with molecular profiling; 33 of 39 had liver metastases and pre-treatment multiphase CT (triple-mutant: APC/KRAS/TP53, n=21; wildtype, n=12). We performed a 2 part analysis on portal venous phase images using: i) Enhancement ratios of manual attenuation measurements and ii) CT texture. i) Enhancement ratio: Attenuation of largest metastasis, liver, and aorta was measured at the same axial level. Attenuation ratio of metastasis to aorta was correlated with the molecular profile. ii) CT texture: Image segmentation and quantitative imaging feature extraction were performed including image gradients, co-occurrence matrices, and pixel neighborhood statistics. Statistical analysis included Spearman correlation and AUR for ROC. Pairwise analyses and independent t-tests were used to compare the means of identified imaging features for CT texture. A random forest classifier was built to determine an integrated imaging signature for triple-mutant detection; $p < 0.05$ was considered statistically significant.

RESULTS

The median number of metastases/patient =2 (range, 1-9), median size =2.9 cm (range, 0.5 - 9.6). Average attenuation of metastases was MT 53.6 HU and WT 57.4 HU. For MT only, attenuation of metastases correlated with liver attenuation (R=0.86), $p \leq 0.001$. On ROC analysis, the AUC was 0.8 for identification of mutation status with metastasis/aorta ratio. An attenuation ratio threshold of <0.33 for MT status had 70% sensitivity, 84.6% specificity, 87.5% PPV, 64.7% NPV, and 75.8% accuracy. For CT texture, imaging feature analyses of pairwise differences between MT and WT images were statistically significant; top features including skewness (p=0.02), energy (p=0.03), and entropy (p=0.03). In-sample training accuracy for prediction of tumor mutation status was 66%.

CONCLUSION

CT features of liver metastases may be used to determine mutation status in CRC. The inclusion of the aorta as an internal standard may be beneficial in CT characterization.

CLINICAL RELEVANCE/APPLICATION

Triple-mutant colorectal cancer is associated with poor survival and lack of response to targeted therapies. CT identification of genomic mutations in CRC may help identify resistance to targeted therapy.

GI380-SD-SUA7 The Diagnostic Performance of LI-RADS Version 2018 and Modified LI-RADS Major Features in the Diagnosis of 10-19 mm HCC Using Extracellular Contrast-Enhanced MRI

Station #7

Participants
Jin Wang, MD, Guangzhou, China (*Presenter*) Nothing to Disclose
Jingbiao Chen, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Sichi Kuang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Yao Zhang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Sidong Xie, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Binjun He, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Bing Hu, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Kathryn J. Fowler, MD, San Diego, CA (*Abstract Co-Author*) Consultant, 12 Sigma Technologies; Researcher, Nuance Communications, Inc; Contractor, Midamerica Transplant Services; ;
Claude B. Sirlin, MD, San Diego, CA (*Abstract Co-Author*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc

For information about this presentation, contact:

wangjin3@mail.sysu.edu.cn

PURPOSE

To evaluate the diagnostic performance of LI-RADS v2018 for 10-19 mm HCC and whether modifications of LI-RADS criteria could improve sensitivity without reducing specificity.

METHOD AND MATERIALS

Our IRB approved this retrospective singe-center study with waived informed consent requirement of all patients with chronic liver disease with 10-19 mm observations on extracellular contrast agent-enhanced (ECA-) MRI from 2004 to 2018. Based on histopathology or composite clinical and imaging data after a minimum of two years of follow up, the 160 observations in 156 patients included 136 (85%) HCCs, 3 (1.9%) iCCAs, 2 (1.3%) cHCC-CCAs, 1 (0.6%) dysplastic nodule, 2 (1.3%) hepatocellular adenomas, 4 (2.5%) focal nodular hyperplasias, 4 (2.5%) hemangiomas, 7 (4.4%) perfusion alterations, and 1 (0.6%) inflammatory scarring. LI-RADS MR major features (except threshold growth) were retrospectively assessed by two radiologists in consensus, blinded to the reference standard. Observations were categorized according to LI-RADS v2018 as well as four modified LI-RADSs versions including the following as LR-5 criteria: arterial phase hyperenhancement(APHE) and capsule only (mLI-RADS I), "washout" without APHE (mLI-RADS II), "washout" and "capsule" without APHE (mLI-RADS III), "washout" or "capsule" without APHE (mLI-RADS IV). Diagnostic performance parameters of LR-5 using v2018 and of each modified LI-RADS were assessed.

RESULTS

Using LI-RADS v2018, 0% LR-1 (0/3) and LR-2 (0/8), 75% (21/28) LR-3, 87.5% (14/16) LR-4, 97.9% (94/96) LR-5, and 77.8% (7/9) LR-M were HCC. As shown in Table 1, the accuracy of LR-5 using LI-RADS 2018 for 10-19 mm HCC was modest. mLI-RADS II provided higher sensitivity (72.1 vs. 69.1%) and accuracy (75.0% vs. 72.5%) than LI-RADS v2018 while maintaining high specificity (91.7% vs. 91.7%). mLI-RADS IV provided the highest accuracy (78.1%) and sensitivity (76.5%) but lower specificity (87.5%).

CONCLUSION

The diagnostic accuracy of LR-5 using LI-RADS v2018 for 10-19 mm HCC was modest using ECA-MRI in patients with chronic liver disease. Modification of LI-RADS criteria may improve sensitivity without reducing specificity.

CLINICAL RELEVANCE/APPLICATION

Expanding the LI-RADS 5 criteria to include "washout" without APHE for 10-19 mm observations may improve sensitivity for HCC without impairing specificity.

GI274-ED-SUA8 Weighing In: Fluoroscopy of Anatomy and Complications After Weight Loss Surgery

Station #8

Participants
Elizabeth A. Bellew, MD, New Hyde Park, NY (*Presenter*) Nothing to Disclose
Towhid Ali, MD, South Ozone Park, NY (*Abstract Co-Author*) Nothing to Disclose
Riya Goyal, MD, Mineola, NY (*Abstract Co-Author*) Nothing to Disclose
John J. Hines JR, MD, Huntington, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ebellew@northwell.edu

TEACHING POINTS

1. Review of appropriate fluoroscopic technique and timing for an esophagram/Upper GI series in the post-operative period2. Review of the common weight loss surgical procedures, including their expected post-surgical anatomy and their acute and chronic common/uncommon complications: -Gastric banding-Gastric sleeve-Roux-en-Y-Duodenal switch

TABLE OF CONTENTS/OUTLINE

1. Background/Introduction -Indications and considerations for the various weight-loss surgical procedures -Mechanisms of weight loss based on procedure-Review of appropriate technique of esophagram/upper GI in post-operative period including a discussion of choice of oral contrast, positions, magnification, and delayed or overhead radiographs -Review of the individual procedures (gastric band, gastric sleeve, Roux-en-Y, duodenal switch), based on their complexity and efficiency, their post-operative anatomy, and complications in the acute post-operative period as well as long-term complications 2. Examples of expected post-operative fluoroscopic findings and post-operative complications with multi-modality imaging, with an emphasis on fluoroscopic diagnosis, and including radiographic and CT findings, when appropriate3. Discussion of the benefits and limitations of the use of fluoroscopy in the post-operative period for weight-loss surgeries

GI272-ED-SUA9 Imaging Chemotherapy-Induced Liver Toxicity: What Every Radiologist Should Know

Station #9

Participants
Matheus Dorigatti Soldatelli, MD, Porto Alegre, Brazil (*Presenter*) Nothing to Disclose
Giovanni B. Torri, MD, Porto Alegre, Brazil (*Abstract Co-Author*) Nothing to Disclose
Gustavo F. Luersen, MD, Porto Alegre, Brazil (*Abstract Co-Author*) Nothing to Disclose
Caroline Lorenzoni Almeida Ghezzi, MD,PhD, Porto Alegre, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

md.soldatelli@gmail.com

TEACHING POINTS

The purpose of this exhibit is to: Review the hepatic chemotherapy-induced toxicity and correlate to the major contemporary chemotherapeutic agents and their clinical use. Discuss and illustrate the pathophysiologic mechanisms and imaging findings of diffuse and focal hepatic conditions secondary to chemotherapy and their main differential diagnosis. Increase radiologists'

awareness of these imaging features allowing for early detection, avoiding misdiagnosis for neoplastic progression and improving patient care.

TABLE OF CONTENTS/OUTLINE

Major classes of chemotherapeutic agents, clinical use and hepatotoxicity Diffuse liver manifestations: Steatosis/steatohepatitis Sinusoidal obstructive syndrome (SOS) Pseudocirrhosis Chemotherapy-induced focal hepatopathy: Focal nodular hyperplasia Focal steatosis Focal SOS Conclusion and future directions

GI273-ED-SUA10 Cross-Sectional Imaging of Malabsorption Syndromes: A Primer for the Contemporary Radiologist

Station #10

Awards

Identified for RadioGraphics

Participants
Samir A. Khwaja, FRCR,MBBS, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Nasir M. Jaffer, MD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Korosh Khalili, MD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Khaled Y. Elbanna, MBChB,FRCR, Vancouver, ON (*Abstract Co-Author*) Nothing to Disclose
Richard Kirsch, MD, PhD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Luis S. Guimaraes, MD,PhD, Toronto, ON (*Presenter*) Nothing to Disclose

TEACHING POINTS

1. To familiarise radiologists with cross-sectional imaging findings that lead you to suspect an underlying malabsorption syndrome. 2. To show how CT/MR enterography are useful tools in diagnosing malabsorption syndromes. 3. To summarize key clinical investigations a radiologist should know which can confirm the diagnosis.

TABLE OF CONTENTS/OUTLINE

Malabsorption syndromes can be challenging to diagnose clinically due to vague symptoms which develop slowly over time. Although our understanding of these entities has evolved from barium studies, recognition of typical cross-sectional imaging findings is often overlooked which can lead to delayed diagnosis. In our exhibit you will: 1. Learn the pathophysiology, causes and clinical investigations for malabsorption. 2. Recognise how specific CT/MR findings together with clinical presentation can narrow the differential diagnosis. 3. Highlight diseases involving the small bowel associated with malabsorption such as celiac disease, scleroderma, lupus enteritis, amyloidosis, Whipple's disease, jejuno-ileal diverticulosis, eosinophilic duodenitis, intestinal lymphangiectasia, radiation enteritis and infectious enteritides with endoscopic and pathologic correlation.

GI275-ED-SUA11 MR Imaging of Anal Canal: A Primer for Radiologists

Station #11

Awards

Cum Laude

Participants
Adriano Basso Dias, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Isabela D. Alves, MD, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Caio S. Rizkallah Nahas, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Shannon P. Sheedy, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Sergio Nahas, MD, PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Marc J. Gollub, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Natally Horvat, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

natallymhorvat@gmail.com

TEACHING POINTS

- Understand the current concepts and management of anal disorders - Recognize anal anatomy and the main surgical techniques of benign and malignant diseases of the anal canal - Comprehend the anal MRI technique, common difficulties, and how to overcome them - Know the role and limitations of anorectal MRI - Recognize the most important imaging features to report in benign and malignant anal lesions

TABLE OF CONTENTS/OUTLINE

INTRODUCTION - Epidemiology of anal and perianal disorders / ANATOMICAL AND HISTOLOGICAL CONCEPTS - Key anatomical landmarks demonstrated by illustrations with MRI correlation / SURGICAL TECHNIQUES - Types of surgical approaches in anal disorders / MRI TECHNIQUE - Preparation - MRI protocol and how to optimize it - Difficulties and how to overcome them / ROLE OF IMAGING IN THE DIAGNOSTIC APPROACH AND MANAGEMENT OF THE MOST COMMON BENIGN AND MALIGNANT DISEASES OF THE ANAL CANAL / Classification A) Benign entities - Perianal fistulas - Hemorrhoidal disease - Proctitis - Perianal abscess - Anal stricture / stenosis - Anal mucosal prolapse - Scarring from obstetrical trauma - Skin tags B) Anal squamous cell carcinoma / SYSTEMATIC APPROACH TO EVALUATE ANAL MRI - What to report in the evaluation of benign and malignant anal diseases - MRI anal carcinoma structured report template

GI276-ED-SUA12 Intestinal Failure and Small Bowel Transplantation: Spectrum of Imaging Features and Complications

Station #12

Awards

Cum Laude

Participants
Ayman H. Gaballah, MD, FRCR, Columbia, MO (*Presenter*) Nothing to Disclose
Amr Shabana, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Mohammed Al-Turiqy, Riyadh, Saudi Arabia, Saudi Arabia (*Abstract Co-Author*) Nothing to Disclose

Mohammed A. Neimatallah, MD, Riyadh, Saudi Arabia (*Abstract Co-Author*) Nothing to Disclose
Khalid A. Kabeel, MD, Columbia, MO (*Abstract Co-Author*) Nothing to Disclose
Ahmed H. Abdelrahman, MD, Columbia, MO (*Abstract Co-Author*) Nothing to Disclose
Khaled M. Elsayes, MD, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Peter S. Liu, MD, Solon, OH (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

gaballaha@health.missouri.edu

TEACHING POINTS

Review history, advances and surgical techniques in small bowel transplantation Discuss causes of intestinal failure and indications of small bowel transplantation Illustrate the role of different imaging modalities in assessing these patients pre- and post-operatively Describe spectrum of imaging features in cases of intestinal failure and small bowel transplantation Assess complications of small bowel transplantation

TABLE OF CONTENTS/OUTLINE

Overview / Introduction Etiology, clinical presentation of intestinal failure and indications of small bowel transplantation Imaging modalities and spectrum of imaging features Case presentation illustrating indications, postoperative changes and complications Impact of imaging findings on management

GI008-EB-SUA Multidisciplinary Oncologic Approach of Anal Cancer: What the Radiologist Needs to Know

Hardcopy Backboard

Participants
Miguel E. Nazar, MD, Buenos Aires, Argentina (*Abstract Co-Author*) Nothing to Disclose
Luciano Castro Cavallo, MD, Buenos Aires, Argentina (*Abstract Co-Author*) Nothing to Disclose
Maria B. Saborido, CABA, Argentina (*Presenter*) Nothing to Disclose
Maria A. Ramirez, CABA, Argentina (*Abstract Co-Author*) Nothing to Disclose
Eduardo Eyheremendy, MD, Buenos Aires, Argentina (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Identify relevant anatomical landmarks for local staging of anal cancer in MRI. Recognize the optimal MRI protocol indicated for the staging of the primary tumor and the readjustment of the anal canal. List the key points that should be included in the radiological report for primary staging, restaging after neoadjuvant and local recurrence.

TABLE OF CONTENTS/OUTLINE

Currently, the multidisciplinary approach in anal cancer requires a more meticulous analysis of the pathology, which reflects in staging (TNM) and treatment. This leads to a more generalized use of anal canal MRI and demands a greater radiologist knowledge of the staging features. Rectal MRI plays a key role in pre- and post-treatment evaluation of rectal cancer, helping the multidisciplinary team to select the most appropriate therapy option. In primary staging, anal canal MRI enables the radiologist to describe the location and morphology of the tumor, provides its categories T and N, detects the presence of extramural vascular invasion and identifies its relationship with surrounding structures, including the sphincter complex and the intersphincteric space. In post-adjuvant re-evaluation, in addition to reevaluating the characteristics observed during primary staging, anal MRI is a useful tool in the evaluation of the response to treatment.

GIS-SUB

Gastrointestinal Sunday Poster Discussions

Sunday, Dec. 1 1:00PM - 1:30PM Room: GI Community, Learning Center

GI

AMA PRA Category 1 Credit ™: .50

FDA Discussions may include off-label uses.

Participants
Harrison Kim, PhD, MBA, Birmingham, AL (*Moderator*) Nothing to Disclose

Sub-Events

GI334-SD-SUB1 Non-Invasive MR Assessment of the Microstructure and Microcirculation in Regional Lymph Nodes for Rectal Cancer: A Study of Intravoxel Incoherent Motion Imaging

Station #1

Participants
Xinyue Yang, Guangzhou, China (*Presenter*) Nothing to Disclose
Yan Chen, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Ziqiang Wen, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Yiyan Liu, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Shen Ping Yu, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Wen Liang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Xianyue Quan, MD, PhD, Guangzhou City, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yangxinyue1991@126.com

PURPOSE

The aim of this study is to evaluate the microstructure and microcirculation of regional lymph nodes (LNs) in rectal cancer by using non-invasive intravoxel incoherent motion MRI (IVIM-MRI), and to distinguish metastatic from non-metastatic LNs by quantitative parameters.

METHOD AND MATERIALS

All recruited patients underwent IVIM-MRI (b=0, 5, 10, 20, 30, 40, 60, 80, 100, 150, 200, 400, 600, 1000, 1500 and 2000 s/mm2) on a 3.0 T MRI system. 168 regional LNs with a short-axis diameter equal to or greater than 5 millimetres from 116 patients were evaluated by two radiologists independently, including 78 malignant LNs and 90 benign LNs. The following parameters were assessed: the short-axis diameter (S), long-axis diameter (L), short- to long-axis diameter ratio (S/L), pure diffusion coefficient (D), pseudo-diffusion coefficient (D*), and perfusion factor (f). Intraclass correlation coefficients (ICCs) were calculated to assess the interobserver agreement between two readers. Receiver operating characteristic (ROC) curves were applied for analyzing statistically significant parameters.

RESULTS

Interobserver agreement of IVIM-MRI parameters between two readers was excellent (ICCs>0.75). The metastatic group exhibited higher S, L and D (P<0.001), but lower f (P<0.001) than the non-metastatic group. The AUC (95% CI, sensitivity, specificity) of the multi-parameter combined equation for D, f and S was 0.811 (0.744~0.868, 62.82%, 87.78%). The diagnostic performance of the multi-parameter model was better than that of an individual parameter (P<0.05).

CONCLUSION

IVIM-MRI parameters provided information about the microstructure and microcirculation of regional LNs in rectal cancer, also improved diagnostic performance in identifying metastatic LNs.

CLINICAL RELEVANCE/APPLICATION

Nodal status is a key point in determining the therapeutic strategy of rectal cancer patients. The multi-parameter model comprising D, f and S improved performance in diagnosing nodal status.

GI335-SD-SUB2 Hepatocellular Carcinoma Screening Patterns with Imaging: Experience Form a Tertiary Care Transplant Center

Station #2

Participants
Gabriela Herandez-Meza, New York, NY (*Presenter*) Nothing to Disclose
Naik Vietti Violi, Lausanne, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Katherine Smith, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Xing Chin, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Joseph W. Song, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Eitan Novogrodsky, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Daniela Said, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

Shingo Kihira, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Keith Sigel, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Dillan Villavisanis, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Justin Frere, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Samuel Maron, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Mini Chung, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Mary Sun, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Maxwell Segall, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Bachir Taouli, MD, New York, NY (*Abstract Co-Author*) Research Grant, Bayer AG; Research Grant, Takeda Pharmaceutical Company Limited; Research Grant, Regeneron Pharmaceuticals, Inc; Consultant, Alexion Pharmaceuticals, Inc; Consultant, Bayer AG; ;

PURPOSE

Hepatocellular carcinoma (HCC) screening is an effective method for early detection and effective treatment. Our purpose was to investigate the patterns of HCC screening with imaging at a tertiary care transplant center.

METHOD AND MATERIALS

This is a retrospective IRB approved study where referrals for HCC screening during the year 2017 were identified via RIS system. The first imaging event for each patient was identified. Inclusion included criteria: chronic liver disease, cirrhosis, HBV non cirrhotic, age >18y. Exclusion criteria included: prior history of HCC, liver transplant, metastasis screening, non-cirrhotic HCV and acute disease. Demographic information, medical history and imaging results were recorded. Association between imaging methods (US, CT, MRI) and race/ethnicity, BMI, etiology and referring physician were analyzed by Chi-Square test. Imaging preferences of referring physicians (N=28) were assessed by a survey.

RESULTS

1374 patients were identified with mean age of 59±12y, 59% male, 23% Caucasian (C), 23% Hispanic (H), 12% Asian (A) and 7% African American (AA), 34% unknow/other race/ethnicity, mean BMI 28.4±6.1, mean AFP 28.1±576.2. Liver disease etiology was as follows: HCV 35%, HBV 18%, alcohol 16%, NAFLD 14% and other 17%. 82% had cirrhosis. Imaging method utilization for MRI/US/CT was 51%/ 33%/ 16%. Imaging modality was associated with race/ethnicity ($p<0.001$), BMI ($p=0.019$), etiology ($p<0.001$) and type of referral (transplant hepatologist) ($p<0.001$). Our survey of physicians cited preference for MRI in 44%, US alternating with CT or MRI in 31%, US alone in 13% and CT alone in 12%. Factors cited as relevant for imaging selection included: etiology (38%), Child-Pugh class (63%), weight/BMI (44%) and insurance coverage (44%). Positive observations were found in 222 patients with 56 patients with HCC (mean size 2.2 ± 1.2 cm), providing a cumulative incidence of 4%.

CONCLUSION

MRI was the most frequently used modality (51%) for HCC screening, while only 33% received US, in contrast with the current AASLD guidelines. Race/ethnicity, BMI, etiology and referral by transplant hepatologist were associated with the preferred imaging method for HCC screening.

CLINICAL RELEVANCE/APPLICATION

Our clinical practice demonstrate that MRI is preferentially used for HCC screening (>50% of cases), in contrast to AASLD guidelines. Imaging method selection was associated with race, BMI, etiology and referring physician.

GI336-SD-SUB3 Deep Learning Reconstruction Can Improve Image Quality and Subjective Acceptance in Low Radiation Dose Abdominal CT: Comparison with Iterative Reconstruction Algorithm

Station #3

Participants
Seitaro Oda, MD, Kumamoto, Japan (*Presenter*) Nothing to Disclose
Narumi Taguchi, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Takafumi Emoto, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Takeshi Nakaura, MD, Amakusa, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshinori Funama, PhD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Masafumi Kidoh, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Yasunori Nagayama, MD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroyuki Uetani, Amakusa, Japan (*Abstract Co-Author*) Nothing to Disclose
Akira Sasao, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasuyuki Yamashita, MD, Kumamoto, Japan (*Abstract Co-Author*) Consultant, DAIICHI SANKYO Group

PURPOSE

This study aimed to assess the effect of deep learning reconstruction (DLR) on image quality and subjective acceptance of low radiation dose abdominal CT in comparison with iterative reconstruction (IR) algorithm.

METHOD AND MATERIALS

This study included 21 patients who underwent low radiation dose abdominal CT. The CT data was post-processed using filtered back projection (FBP), IR (AIDR-3D body standard), and DLR (AiCE body standard). Objective and subjective image quality parameters were compared among the three different methods. Objective parameters included image noise and CT attenuation. Subjective image quality parameters, i.e. depiction of the upper abdominal organs, pelvic organs, bone, and soft tissue were scored on a 5-point scale. For images reconstructed with both IR and DLR, subjective acceptance of image appearance was evaluated using a 5-point scale.

RESULTS

The mean CTDIvol and estimated effective dose were 1.2 ± 0.4 mGy and 1.1 ± 0.7 mSv for the low dose abdominal CT. There was no significant difference in CT attenuation among the 3 reconstruction methods. The mean image noise on FBP, IR, and DLR images was 35.8 ± 3.5, 14.0 ± 0.9, and 11.9 ± 1.3 HU, respectively. The difference among all reconstruction combinations was significant ($P < 0.01$). The subjective image quality scores were significantly higher for DLR than the other images for all parameters ($p < 0.01$). The scores for subjective acceptance of image appearance were significantly higher for DLR than for IR ($P < 0.01$).

CONCLUSION

DLR can yield significantly improved image quality and subjective acceptance in low radiation dose abdominal CT.

CLINICAL RELEVANCE/APPLICATION

Compared to IR algorithm, DLR can present a higher image quality and provide images improved subjective acceptance in low radiation dose abdominal CT.

GI381-SD-SUB4 Assessment of Aggressiveness of Rectal Cancer Using Quantitative Parameters Derived from Dual-Energy Spectral Computed Tomography

Station #4

Participants
Yi Li, Tianjin , China (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

liyiemily@163.com

PURPOSE

To evaluate the value of quantitative parameters derived from DESCT in the assessment of aggressiveness of rectal cancer.

METHOD AND MATERIALS

Seventy-eight patients with rectal cancers confirmed by pathology underwent contrasted DESCT scans. The normalized iodine concentration (NIC) and normalized water concentration (NWC) of the tumor against artery were measured. The quantitative parameters were compared and statistically analyzed between subgroups based on the following prognostic factors: pretreatment carcinoembryonic antigen (CEA) levels, mesorectal fascia (MRF) status, T stage (T1,2 and T3,4), N stage (N0 and N1,2), differentiation grade (poorly differentiated, poorly-moderately differentiated, moderately differentiated, moderately-well differentiated, well differentiated), and lymphangiovascular invasion. The independent two-sample t test was performed to assess differences between means of the subgroups.

RESULTS

The differences of NICs between MRF-free and MRF-invaded groups (P=0.042), between T2 and T3-4 stage groups (P=0.044), between N0 and N+ (N1, 2) groups (P=0.036), between poorly differentiated group and other differentiated groups (P<0.05)were significant, respectively. For CEA levels and lymphangiovascular invasion, no significant differences existed between subgroups. For NWCs, there were no significant differences between subgroups based on the prognostic factors above all.

CONCLUSION

Higher NIC value is associated with a more aggressive tumor character. NIC may have the potential to become an imaging biomarker of tumor aggressiveness character.

CLINICAL RELEVANCE/APPLICATION

Quantitative parameters derived from dual-energy spectral computed tomography may have the potential to become an imaging biomarker of tumor aggressiveness character.

GI382-SD-SUB5 Radiogenomics of Colorectal Adenocarcinoma: Quantitative and Quantitative Analysis of the Hepatic Metastases on CT for Prediction of KRAS Mutation -Preliminary Results

Station #5

Participants
Gabriela R. Camerin, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Felipe Augusto de M. Machado, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Yone d. Setogute, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Mariana P. Macedo, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Maria D. Souza, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Natally Horvat, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Giovanni G. Cerri, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Rodrigo E. de Paula, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Antonildes N. Assuncao JR, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Anna L. Boschiroli Lamanna Puga, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

gabicamerin@gmail.com

PURPOSE

To investigate if qualitative and quantitative textural features on contrast-enhanced CT of the hepatic metastasis at primary staging can predict KRAS mutation in patients with colorectal adenocarcinoma.

METHOD AND MATERIALS

In this IRB-approved study we retrospectively evaluated consecutive patients with colorectal adenocarcinoma treated at our institution from January 2016 to March 2019. The exclusion criteria were (a) pre-treatment contrast-enhanced CT unavailable and (b) no genetic profile available. Our final study population was 15 patients. One experienced oncologist with 5 years of experience reviewed the medical record of patients. One experienced radiologist evaluated qualitative characteristics of the liver metastasis based on a subjective evaluation. The radiologist also manually segmented all the liver metastases in all slices on venous phase of CT using a free open-source software package ITK-SNAP version 3.4.0 in order to provide the volume of interest (VOI) of the tumor for extraction of the quantitative textural features - radiomics signature. Statistical analysis was performed to evaluate associations between qualitative features and quantitative textural features and KRAS mutation.

RESULTS

The mean age of the patients was 57 years (range, 32-85). 7/15 (47%) were men. 13/15 (87%) had the primary tumor in the right

The mean age of the patients was 57 years (range, 32-85); 7/15 (47%) were men; 13/15 (87%) had the primary tumor in the right colon, 8/15 (53%) had distant metastases only within the liver. The quantitative textural features on CT using the VOI of the liver metastases demonstrated that contrast, contrast 135, dissimilarity, dissimilarity 90, and dissimilarity 135 were significantly different between patients with wild-type and mutated KRAS (p-values = 0.04, 0.02, 0.02, 0.01, and 0.02, respectively). Qualitative features demonstrated no significant difference between these two groups.

CONCLUSION

In our population, some texture features of the liver metastases on CT predicted the presence of KRAS mutation.

CLINICAL RELEVANCE/APPLICATION

The biology of colorectal cancer tumor has evolved over the last decade, guiding patient's treatment. Radiomics and radiogenomics have the potential of providing a genetic profile based on conventional imaging modalities. However, it still lacks robustness before widespread use.

GI383-SD-SUB6 Clinical Significance of the Differences between the CT/MRI LI-RADS 5 and the OPTN Class 5 Classifications for Small 10-19mm Hepatic Nodules with Non-Rim Arterial Phase Hyper-Enhancement (APHE)

Station #6

Participants
Mauro M. Hanaoka, MD, Lexington, KY (*Presenter*) Nothing to Disclose
Mohamed Issa, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Carlos Kuria, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Yarik Bezkor, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Elias Nassar, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
James T. Lee, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

hanaoka@uky.edu

PURPOSE

The rationale of the LI-RADS v2018 is to simplify and achieve concordance with definitions advocated by AASLD and OPTN. LI-RADS and OPTN criteria for HCC are similar, except for 10-19 mm observations with arterial phase hyper-enhancement (APHE) and non-peripheral "washout" (NPW). The purpose of this study is to determine the clinical significance of this exception.

METHOD AND MATERIALS

IRB approval was obtained. HIPAA-compliant. We searched our retrospectively maintained database for consecutive patients who underwent performed CT and/or MRI, from January 1, 2016 to July 1, 2018, with reported LR-4 and LR-5 with observations 10-19 mm in size with non-rim APHE. These nodules were subsequently classified according to the CT/MRI LI-RADS v2018 and the OPTN criteria. Our final study population consisted of 23 of 501 patients. Statistical analyses were performed with software package R and SAS (version 9.4; SAS Institute, Cary, NC).

RESULTS

Overall, 23 of 768 (2.9%) patients with LR-5 with observations 10-19 mm in size with non-rim APHE were identified. 12 patients (1.5%) had observations with NPW and EC. These met criteria for OPTN 5A. 2 patients (0.2%) had observations with TG and met OPTN 5A-g criteria. 9 patients (1.1%) with only NPW could be classified as LR-5 but are not assigned to any OPTN Class (Yates' chi-square 8.841, p-value 0.0029).

CONCLUSION

LI-RADS, AASLD and OPTN criteria as overall similiar. In 2018, LI-RADS and AASLD have achieve complete concordance. The only discordance between the LI-RADS and the OPTN criteria is the classification of observations 10-19 mm in size with APHE and NPW. Although relatively infrequent, ocurring in 1.1% of the cases, it is nevertheless statistically significant.

CLINICAL RELEVANCE/APPLICATION

Although CT/MRI LI-RADS v2018 is a new and powerful tool that should be use in the evaluation of hepatocellular carcinoma (HCC), further investigation is required obtain a unified LIRADS, AASLD and OPTN criteria.

GI280-ED-SUB7 Multimodality Imaging of the Transplant Liver: A Primer

Station #7

Participants
Amit Pandya, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Shadi F. Azar, MBBS, Milan, MI (*Abstract Co-Author*) Nothing to Disclose
Laura S. O'Donohue, BA, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
Carolina M. Ramirez Vizcarrondo, BA, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
Ronald O. Bude, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
Ashish P. Wasnik, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

amitpand@med.umich.edu

TEACHING POINTS

1. Review indications and surgical techniques of cadaveric and living split liver transplant 2. Review multimodal imaging of normal liver transplant as well as vascular and non-vascular complications that can help timely diagnosis and appropriate management 3. Present structured templates in liver transplants that can help communicate relevant findings related to the surgical team

TABLE OF CONTENTS/OUTLINE

Overview of indications and surgical techniques in liver transplant (cadaveric, living donor and split) with schematic illustrations Role of various imaging modalities (Ultrasound, CT, MR, nuclear medicine, DSA) in liver transplant evaluation Multimodality imaging of normal post-transplant liver appearance, and vascular and non-vascular complications Review of following complications with illustrated examples: Vascular : Hepatic artery stenosis/thrombosis, arterial pseudoaneurysm, arteriovenous fistula Portal vein, Hepatic vein, IVC stenosis/thrombosis Biliary: Biliary obstruction, leak Parenchymal: Infarct, rejection, abscess Perigraft hematoma, abscess Structured reporting template for liver transplant evaluation

GI281-ED-SUB8 Where's the Leak? Radiographic Evaluation of Common Gastrointestinal Post-Operative Procedures

Station #8

Participants
Joshua I. Katz, DO, Morristown, NJ (*Presenter*) Nothing to Disclose
Michael C. Prasad Jr, MD, South Orange, NJ (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Joshkatz10@gmail.com

TEACHING POINTS

TEACHING POINTS 1. Review anatomy of common gastrointestinal surgical procedures 2. Describe the surgical approach to multiple GI interventions and radiographic evaluation of the post-operative patient utilizing imaging modalities including fluoroscopy and computed tomography. 3. Review the potential complications of common GI surgical procedures and identify them on imaging studies.

TABLE OF CONTENTS/OUTLINE

TABLE OF CONTENTS/OUTLINE Surgery and radiology often collaborate to assess a patient in a post-operative state from a gastrointestinal procedure to evaluate for potential complications. It is critical for a radiologist to understand the surgical approach of the procedure and potential complications to provide an adequate post-operative evaluation. This educational review of common GI surgical procedures will evaluate the imaging characteristic of normal post-operative states and their potential post-operative complications. After completing this educational exhibit, the reader will be able to evaluate multiple common gastrointestinal post-operative states and their potential complications. Outline Esophagectomy Sleeve gastrectomy Roux-en-Y gastric bypass Whipple procedure Ileoanal Anastomosis (J-Pouch)

GI282-ED-SUB9 MR Cholangiopancreatography: What Every Radiology Resident Must Know

Station #9

Awards
Identified for RadioGraphics

Participants
Bruno P. Vidal, MD, Campinas, Brazil (*Presenter*) Nothing to Disclose
Daniel Lahan-Martins, MD, PhD, Campinas, Brazil (*Abstract Co-Author*) Nothing to Disclose
Marco A. Rodstein, MD, Campinas, Brazil (*Abstract Co-Author*) Nothing to Disclose
Thiago J. Penachim, MD, Campinas, Brazil (*Abstract Co-Author*) Nothing to Disclose
Patricia P. Cardia, MD,PhD, Campinas, Brazil (*Abstract Co-Author*) Nothing to Disclose
Adilson Prando, MD, Campinas, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

bruno.vidal89@gmail.com

TEACHING POINTS

Magnetic resonance (MR) cholangiopancreatography (MRCP) is a widely used noninvasive method in the evaluation of pancreatobiliary disorders. As opposed to endoscopic retrograde cholangiopancreatography (ERCP) it allows evaluation of biliary ducts proximal and distal to injury, as well as extra ductal lesions. It's technique and protocols may vary, but there are some key points that every radiologist must know in order to perform and extract the best out of this method. After reviewing this exhibit, specially aimed for residents, trainees, and their tutors, the learner should be able to: 1. Understand how an MRCP is performed, including contrast enhanced MR cholangiography (CE-MRC), focusing on current techniques, advantages, artifacts, pitfalls and how to avoid them. 2. Discuss the indications of MRCP in correlation to ERCP. 3. Access normal/variant biliary anatomy, and 4. Identify common biliary pathology such as stones, benign/malignant stricture, leaks, iatrogenic and others.

TABLE OF CONTENTS/OUTLINE

1. Introduction. 2. Techniques and Protocols of MRCP. 3. Indications of MRCP. 4. Artifacts, Pitfalls and how to avoid them. 5. Normal/Variant Biliary Anatomy. 5.Biliary Pathology. 6. Conclusion.

GI277-ED-SUB10 Between the Duodenum and the Pancreas - What do We Know about Groove Pancreatitis?

Station #10

Participants
Sharif Darwish, MD, Worcester, MA (*Presenter*) Nothing to Disclose
Shams Jubouri, MBChB, Worcester, MA (*Abstract Co-Author*) Nothing to Disclose
Brian D. Midkiff, MD, MPH, Hopkinton, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

sharif.darwish@stvincenthospital.com

TEACHING POINTS

The purpose of this exhibit is to: 1. Educate the reader of this rare form of chronic pancreatitis including its subtypes, proposed etiology, and pathogenesis. 2. Show characteristic diagnostic CT and MRI imaging findings and discuss potential complications. 3. Identify key differentiators from its mimics including pancreatic adenocarcinoma, ampullary/duodenal adenocarcinoma, duodenitis, and conventional/paraduodenal pancreatitis. 4. Briefly discuss current treatment and management, and explain how a prospective

radiologic diagnosis could potentially save a patient from major abdominal surgery, particularly with high false positive and false negative cytology results.

TABLE OF CONTENTS/OUTLINE

• Anatomy of the pancreaticoduodenal 'groove'. • Etiology, pathogenesis, subtypes and clinical presentation of groove pancreatitis. • Review key imaging findings of groove pancreatitis, its complications and mimics on: - CT. - Conventional MRI. • Current treatment and management options.

GI278-ED-SUB11 Pelvic Nodal Anatomy and Patterns of Nodal Spread in Rectal Cancer

Station #11

Participants
Harmeet Kaur, MD, Houston, TX (*Presenter*) Nothing to Disclose
George J. Chang, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Tsuyoshi Konishi, MD,PhD, Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose
Y. N. You, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Gaiane M. Rauch, MD, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Randy D. Ernst, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

hkaur@mdanderson.org

TEACHING POINTS

Anatomic atlas of pelvic nodal groups and subgroups with clarification of existing misconceptions Discuss patterns of lymphatic spread in rectal cancer as an important determinant of nodal invovlement Defintion of anatomic compartments in the pelvis with specific regard to nodal localization

TABLE OF CONTENTS/OUTLINE

A detailed description of the anatomic nodal groups and subgroups with in the pelvis is provided, this covers pelvic sidewall and mesenteric nodes. The rectum and different regions of the rectum are defined along with the patterns of lymphatic spread from these different nodal regions. Practical examples of how this applies to determining nodal invovlment in rectal cancer along with relevant reserach papers are presented Anatomic compartments in the pelvis are reviewed with regard to accurate localization of nodes. The significance of accurate localization from the perspective of staging and surgical resection is reviewed.

GI279-ED-SUB12 Pancreas in Hereditary Syndromes: Cross-Sectional Imaging Spectrum

Station #12

Awards
Magna Cum Laude
Identified for RadioGraphics

Participants
Suryakala Buddha, MD, DMRD, San Antonio, TX (*Presenter*) Nothing to Disclose
Jignesh N. Shah, MD, Germantown, TN (*Abstract Co-Author*) Nothing to Disclose
Omid Yeganeh Rikhtehgar, MD, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Anil K. Dasyam, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Alia Nazarullah, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Ajaykumar C. Morani, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Meghan G. Lubner, MD, Madison, WI (*Abstract Co-Author*) Grant, Koninklijke Philips NV; Grant, Johnson & Johnson;
Srinivasa R. Prasad, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Venkata S. Katabathina, MD, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

katabathina@uthscsa.edu

TEACHING POINTS

Describe genetics, pathology & clinical features of hereditary syndromes with pancreatic manifestations Review cross-sectional imaging spectrum of pancreatic & extra-pancreatic findings in these syndromes Discuss current updates in early pancreatic cancer Review screening & surveillance guidelines with special emphasis on role of imaging

TABLE OF CONTENTS/OUTLINE

Introduction Hereditary syndromes: Genetics & Pathology a) Pancreatitis: Cystic Fibrosis [CFTR] & Hereditary Pancreatitis [PRSS1 or SPINK1] b) Adenocarcinoma: Familial pancreatic cancer syndrome, Lynch, FAP , Peutz-Jeghers [STK11], FAMMM [CDKN2A], HBOC [BRCA1 & BRCA2] & hereditary pancreatitis. c) Neuroendocrine tumors: MEN type1, VHL, NF type1&TS. d) Pancreatic cystic lesions: Mccune-Albright syndrome [GNAS1], VHL & Peutz-Jeghers e) Pancreatoblastoma: Beckwidth-weideman syndrome. f)Primary Hemochromatosis. Cross-sectional Imaging: US, CT, MRI & EUS Early pancreatic cancer: Role of Imaging Treatment & Prognosis Imaging in Screening & Surveillance Future Directions Conclusion Summary: Imaging plays an important role in detection of pancreatic manifestations in genetic syndromes. Identifying pancreatic cancer precursors helps in early diagnosis and imaging-based screening & surveillance guidelines are pivotal in detecting pancreatic manifestations of hereditary cancer syndromes.

GI311-ED-SUB13 Bariatric Surgery Reduced to Simple Terms

Station #13

Awards
Magna Cum Laude

Participants
Luisa L. Faria, MD , Juiz de Fora, Brazil (*Presenter*) Nothing to Disclose

George F. Darce, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Marco Aurelio S. Filho, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Thiago M. Baraviera, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Anna Carolina B. Dantas, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Marco Aurelio Santo, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Cinthia D. Ortega, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Speaker, Johnson & Johnson
Manoel S. Rocha, MD, PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

luisaleitao@icloud.com

TEACHING POINTS

Obesity is a chronic and multifactorial disease which prevalence has been growing in recent years at an alarming rate. Concomitantly, the number of bariatric surgeries performed has dramatically increased. As a consequence, it is expected that a number of patients will have a recurrent/persistent disease or surgical complications. Imaging may play a key role in evaluating the scenario of post-bariatric surgery patients. The purpose of this exhibit is: (1) to understand the indications for bariatric surgery and the types of surgery, (2) to review surgical techniques and the expected CT postsurgical appearance, (3) to systematize the main complications of bariatric surgery using a case-based approach and (4) to discuss the role of imaging for post bariatric insufficient weight loss or weight regain evaluation.

TABLE OF CONTENTS/OUTLINE

Who is a candidate for bariatric surgery? Guide to types of bariatric surgery and surgical techniques. Surgical and radiological anatomy correlation and postoperative normal appearances. Fluoroscopic gastrointestinal studies and CT protocols for early and late postoperative evaluation. Case-based approach to the main complications of bariatric surgery (fluoroscopic and tomographic findings with surgical/endoscopic correlation). Case-based discussion of insufficient weight loss or weight regain.

Printed on: 10/29/20

RC109

Abbreviated/Faster MRI Abdominal Pelvic Protocols

Sunday, Dec. 1 2:00PM - 3:30PM Room: E450B

GI MR OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Claude B. Sirlin, MD, San Diego, CA (*Moderator*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc

Sub-Events

RC109A Hepatocellular Carcinoma Screening

Participants
Claude B. Sirlin, MD, San Diego, CA (*Presenter*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc

For information about this presentation, contact:

csirlin@ucsd.edu

LEARNING OBJECTIVES

1) Explain the need for HCC screening in adults with cirrhosis. 2) Explain the limitations of ultrasound for HCC screening in adults with cirrhosis, in particular adults with overweight or obesity. 3) Explain one approach for abbreviated MRI for HCC screening as a potential alternative to ultrasound.

RC109B Pancreatic Tumor Evaluation and Follow-up

Participants
Kumaresan Sandrasegaran, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sandrasegaran.kumaresan@mayo.edu

LEARNING OBJECTIVES

1) Understand pitfalls in diagnosing, staging and post-therapy assessment of pancreatic ductal adenocarcinoma (PDAC). 2) Understand what the surgeon and oncologist want from a staging CT/MRI report. 3) Learn to use standardized reporting template for staging PDAC.

ABSTRACT

This presentation covers the diagnosis and staging of pancreas cancer (pancreatic ductal adenocarcinoma). There are multiple pitfalls in the diagnosis of pancreas cancer and these are highlighted. The staging of pancreas cancer has changed in recent years because of advances in surgical and oncologic therapy. Radiologists need to be aware of these developments, so that accurate information may be reported. The value of standardized reporting is discussed.

RC109C Faster MR Enterography

Participants
Michael S. Gee, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To comprehend the indications for MR enterography. 2) To apply structured interpretation and reporting of MR enterography studies. 3) To apply new techniques for decreasing MR enterography scan time.

ABSTRACT

None.

RC109D Participants Rectal Cancer Staging

Michael H. Rosenthal, MD, PhD, Boston, MA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand best practices for MR imaging of rectal cancer at diagnosis. 2) Learn and apply diagnostic criteria to accurately stage rectal adenocarcinomas using MRI. 3) Understand common pitfalls in the interpretation of rectal MRI.

Printed on: 10/29/20

RC110

Liver Sonography 2019: An Update

Sunday, Dec. 1 2:00PM - 3:30PM Room: E350

GI US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

LEARNING OBJECTIVES

1) Understand the limitations of shear wave liver stiffness measurements. 2) Learn how to recognize inaccurate liver stiffness measurements. 3) Learn how to optimize performing liver stiffness measurements. 3) Recognize specific AP enhancement patterns representative of benign liver tumors. will determine malignancy on the basis of washout following any degree of arterial phase enhancement. 4) Appreciate that CEUS will frequently show washout, discordant with increasing enhancement on CECT or CEMR, on the basis of the purely intravascular microbubble contrast agents for US as compared to interstitial contrast agents for CT and MR scan. 5) Diagnose metastatic disease with optimal detection by sweeping the liver in the portal venous and late phase when metastases are most conspicuous. 6) Understand the rationale for screening and surveillance in HCC. 7) Learn the US LI-RADS categories and management recommendations. 8) Understand the US LI-RADS visualization scores. 9) Understand the role of CEUS in the management of patients sent to ablation therapies in pre-treatment planning, intra-procedural and peri-procedural assessment, and follow-up.

Sub-Events

RC110A Liver Elastography: Pearls and Pitfalls

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, Canon Medical Systems Corporation; Research Grant, Esaote SpA; Research Grant, BK Ultrasound; Research Grant, Hitachi, Ltd

LEARNING OBJECTIVES

1) Understand the limitations of shear wave liver stiffness measurements. 2) Learn how to recognize inaccurate liver stiffness measurements. 3) Learn how to optimize performing liver stiffness measurements.

RC110B Liver Tumors: The Fundamentals of Interpretation with CEUS

Participants
Stephanie R. Wilson, MD, Calgary, AB (*Presenter*) Equipment support, Koninklijke Philips NV; Equipment support, Siemens AG; Equipment support, Samsung Electronics Co, Ltd; Research support, LANDAUER, Inc; Research support, Samsung Electronics Co, Ltd; Speakers Bureau, Koninklijke Philips NV

For information about this presentation, contact:

stephanie.wilson@ahs.ca

LEARNING OBJECTIVES

1) Recognize specific AP enhancement patterns representative of benign liver tumors. will determine malignancy on the basis of washout following any degree of arterial phase enhancement. 2) Appreciate that CEUS will frequently show washout, discordant with increasing enhancement on CECT or CEMR, on the basis of the purely intravascular microbubble contrast agents for US as compared to interstitial contrast agents for CT and MR scan. 3) Diagnose metastatic disease with optimal detection by sweeping the liver in the portal venous and late phase when metastases are most conspicuous.

RC110C Diffuse Liver Disease: HCC Surveillance and LI-RADS

Participants
Aya Kamaya, MD, Stanford, CA (*Presenter*) Royalties, Reed Elsevier; Researcher, Koninklijke Philips NV; Researcher, Siemens AG

LEARNING OBJECTIVES

1) Understand the rationale for screening and surveillance in HCC. 2) Learn the US LI-RADS categories and management recommendations. 3) Understand the US LI-RADS visualization scores.

RC110D CEUS for Liver Lesion Intervention and Follow-up

Participants
Franca Meloni, MD, Milano, Italy (*Presenter*) Research Consultant, Johnson & Johnson; Speaker, Bracco Group

LEARNING OBJECTIVES

1) Understand the role of CEUS in the management of patients sent to ablation therapies in pre-treatment planning, intra-procedural and peri-procedural assessment, and follow-up.

ABSTRACT

• Ultrasound (US) is considered the first imaging modality used to guide percutaneous interventional procedures. CECT and CEMRI are frequently used to assess completeness of ablation. • CEUS is an ideal imaging modality for the management of oncologic patients for clinical diagnostic imaging and interventional work-up during the planning, guidance, and immediate assessment of the treatment and follow-up. • Planning of the treatment includes the assessment of size, number, vascularization and tumor margins of the ablation target. • In pretreatment study, CEUS is complementary to CECT and/or CEMRI for tumor staging. • During the procedure, CEUS can guide the needle insertion in cases of inconspicuity of the target or an occult tumor at unenhanced ultrasound. • At the end of the ablation, multiple artifacts of post-procedure gas are present and require a 10/15 minute wait time for their resolution. When only a few bubbles of gas remain visible, CEUS reinjection permits detection of vascular residual tumor and guidance for immediate retreatment. This approach reduces incomplete ablation from 16 to 6% of cases. • In the assessment of tumor post ablation, the use of CEUS is indicated when CECT or CEMRI are contraindicated or inconclusive. CEUS allows further information on the evaluation of tumor recurrence in both HCC and metastases and should be included in addition to CECT/CEMRI in follow-up protocols.

RC131

Tumor Ablation Beyond the Liver: Practical Techniques for Success (Hands-on)

Sunday, Dec. 1 2:00PM - 3:30PM Room: N226

GI IR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Debra A. Gervais, MD, Boston, MA (*Presenter*) Nothing to Disclose
Muneeb Ahmed, MD, Boston, MA (*Presenter*) Research Grant, General Electric Company Stockholder, Agile Devices, Inc Scientific Advisory Board, Agile Devices, Inc
Terrance T. Healey, MD, North Scituate, RI (*Presenter*) Nothing to Disclose
Anil N. Kurup, MD, Rochester, MN (*Presenter*) Research Grant, Galil Medical Ltd; Research Grant, EDDA Technology, Inc; Royalties, Wolters Kluwer nv

For information about this presentation, contact:

kurup.anil@mayo.edu

LEARNING OBJECTIVES

1) Describe indications for tumor ablation in extrahepatic sites. 2) Describe approaches and techniques to help prevent 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. Skeletal metastases are extremely common and may be treated for palliation of pain or local control. Clinically significant, durable pain relief occurs in 75-100% of patients treated for this reason. Local control rates in bone/extravisceral soft tissue vary, and most series report rates of 70-98%. Patients selected for palliation of pain should have moderate-severe pain and a targetable, corresponding lesion. Lesions should be treatable with attention to critical structures, especially major nerves. Care should be used when placing probes in the constrained environment of intact bone. Cement should be added in weight-bearing regions.

PS12

Sunday Afternoon Plenary Session

Sunday, Dec. 1 4:00PM - 5:45PM Room: Arie Crown Theater

BR CH GI IR MK NR NM PD

AMA PRA Category 1 Credits ™: 1.75
ARRT Category A+ Credit: 1.75

Participants
Valerie P. Jackson, MD, Tucson, AZ (*Presenter*) Nothing to Disclose

Sub-Events

PS12A Report of the RSNA Research and Education Foundation

Participants
Thomas M. Grist, MD, Madison, WI (*Presenter*) Institutional research support, General Electric Company; Institutional research support, Bracco Group; Institutional research support, Siemens AG; Institutional research support, Hologic, Inc; Institutional research support, McKesson Corporation; Stockholder, Elucent; Stockholder, HistoSonics, Inc;

PS12B Image Interpretation Session

Participants
Neil M. Rofsky, MD, Dallas, TX (*Moderator*) Advisory Board, InSightec Ltd; CME & Education Steering Committee, Medscape, LLC
Laura W. Bancroft, MD, Venice, FL (*Presenter*) Nothing to Disclose
Yoshimi Anzai, MD, Salt Lake City, UT (*Presenter*) Nothing to Disclose
Robert D. Boutin, MD, Davis, CA (*Presenter*) Nothing to Disclose
Govind B. Chavhan, MD, Toronto, ON (*Presenter*) Speaker, Bayer AG
Philippe A. Grenier, MD, Saint Cloud, France (*Presenter*) Nothing to Disclose
S. Nahum Goldberg, MD, Efrat, Israel (*Presenter*) Consultant, AngioDynamics, Inc; Consultant, Cosman Medical, Inc; Consultant, XACT Robotics;
Nicole M. Hindman, MD, New York, NY (*Presenter*) Nothing to Disclose
Jessica W. Leung, MD, Houston, TX (*Presenter*) Scientific Advisory Board, Subtle Medical
Don C. Yoo, MD, Lexington, MA (*Presenter*) Consultant, inviCRO, LLC

For information about this presentation, contact:

drgovindchavhan@yahoo.com

laurabancroftmd@gmail.com

sgoldber@bidmc.harvard.edu

yoshimi.anzai@hsc.utah.edu

donyoo@brown.edu

LEARNING OBJECTIVES

1) Identify key abnormal findings on radiologic studies that are critical to making a specific diagnosis. 2) Construct a logical list of differential diagnoses based on the radiologic findings, focusing on the most probable differential diagnoses. 3) Determine which, if any, additional radiologic studies or procedures are needed in order to make a specific final diagnosis. 4) Choose the most likely diagnosis based on the clinical and the radiologic information.

ED005-MO

Gastrointestinal Monday Case of the Day

Monday, Dec. 2 7:00AM - 11:59PM Room: Case of Day, Learning Center

AMA PRA Category 1 Credit ™: .50

Participants
Anup S. Shetty, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Cameron Adler, MD, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose
Stephanie T. Chang, MD, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose
Amy K. Hara, MD, Scottsdale, AZ (*Abstract Co-Author*) Nothing to Disclose
Maria Zulfiqar, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Joseph R. Grajo, MD, Gainesville, FL (*Abstract Co-Author*) Nothing to Disclose
Laura L. Magnelli, MD, Gainesville, FL (*Abstract Co-Author*) Nothing to Disclose
Joseph W. Owen, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Michael Nisiewicz, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Andres R. Ayoob, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
James T. Lee, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Rex A. Parker III, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Emilie T. Nguyen, MD, Playa Vista, CA (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Each GI case of the day will be taken from disorders of the luminal GI tract as well as the liver, spleen, pancreas, and biliary system. The findings may be uncommon manifestations of common diseases or common manifestations of uncommon diseases.

RC209

Gastrointestinal Series: Pancreas Imaging

Monday, Dec. 2 8:30AM - 12:00PM Room: E353C

GI

AMA PRA Category 1 Credits ™: 3.00
ARRT Category A+ Credits: 3.50

FDA Discussions may include off-label uses.

Participants
Elizabeth M. Hecht, MD, New York, NY (*Moderator*) Nothing to Disclose
Eric P. Tamm, MD, Houston, TX (*Moderator*) Institutional Research Grant, General Electric Company
Desiree E. Morgan, MD, Birmingham, AL (*Moderator*) Institutional Research Grant, General Electric Company; Consultant, General Electric Company
Koenraad J. Mortele, MD, Boston, MA (*Moderator*) Nothing to Disclose

Sub-Events

RC209-01 Advances in Pancreatic CT and MR Imaging

Monday, Dec. 2 8:30AM - 8:50AM Room: E353C

Participants
Elizabeth M. Hecht, MD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ehecht@columbia.edu

LEARNING OBJECTIVES

1) Briefly review the current role of CT and MRI in pancreatic diseases both advantages and limitations. 2) Discuss advances in CT/MR software and hardware technology that can potentially benefit diagnostic pancreatic imaging from scan efficiency and radiation dose reduction to diagnosis and treatment planning.

RC209-02 Chemical Exchange Saturation Transfer (CEST) for Pancreatic Ductal Adenocarcinoma (PDAC) Evaluation

Monday, Dec. 2 8:50AM - 9:00AM Room: E353C

Participants
Lixia Wang, MD, Beijing, China (*Presenter*) Nothing to Disclose
Zhengwei Zhou, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Nan Wang, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Pei Han, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Zixin Deng, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Srinivas Gaddam, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Zhaoyang Fan, West Hollywood, CA (*Abstract Co-Author*) Nothing to Disclose
Anthony Christodoulou, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Tao Jiang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Stephen J Pandol, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Debiao Li, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Lixia.wang@cshs.org

PURPOSE

To evaluate the feasibility of using a pH-sensitive MR imaging - CEST to differentiate between PDAC, non-tumor pancreas (both upstream pancreas which is the distal end toward the tumor and downstream which is the proximal portion to the tumor), and normal control pancreas.

METHOD AND MATERIALS

CEST images from normal volunteers and patients with PDAC were acquired from Dec 1st 2017 to Mar 15th 2019. All PDAC were confirmed with histopathology. The image quality was evaluated, and images with severe motion artifacts were excluded. Regions of interest (ROIs) were determined according to T1-VIBE, T2WI and Diffusion Weighted Imaging (DWI) by an experienced radiologist. APT ratio, i.e., the asymmetric magnetization transfer ratio (MTR) at 3.5 ppm, was measured in PDAC, upstream and downstream pancreas, and normal pancreas. One-way ANOVA and Tukey tests were used to evaluate the differences between groups and within groups. Receiver operating characteristic (ROC) curve was utilized to evaluate CEST in differentiating tumor with non-tumor pancreas.

RESULTS

14 PDAC patients (5 female, median age 65 years (range 46-80 years) and 12 healthy volunteers (5 females, median age 32 years (range 18-66 years) were included in the study. The mean APT ratios (±SD) were 0.014±0.034, -0.041±0.030, -0.019±0.027 respectively in PDAC mass, upstream pancreas and downstream pancreas in the patient group respectively, and -0.008±0.024 in normal pancreas in the volunteer group. Significant differences were found between PDAC and upstream pancreas ($P < 0.001$), and between upstream pancreas and normal control pancreas ($P = 0.04$) . Area under curve (AUC) to differentiat PDAC from non-tumor pancreas was 0.857 (95% confidence interval (CI): 0.724-0.991).

CONCLUSION

pH-sensitive CEST MRI can be used to differentiate PDAC from non-tumor pancreas (upstream and downstream pancreas) as acidic condition is expected in PDAC because of hypoxia. It provides a novel metabolic imaging method in PDAC identification.

CLINICAL RELEVANCE/APPLICATION

PH-sensitive CEST provides a novel metabolic imaging method in PDAC patients and can be used to differentiating tumor with upstream and downstream pancreas.

RC209-03 CT Perfusion Combined with Standard Multiphase CT as a Potential Biomarker for Pancreatic Ductal Adenocarcinoma

Monday, Dec. 2 9:00AM - 9:10AM Room: E353C

Participants
Ryan O'Malley, MD, Seattle, WA (*Presenter*) Research Grant, General Electric Company
Erik Soloff, MD, Seattle, WA (*Abstract Co-Author*) Research Grant, General Electric Company
Janet M. Busey, MS, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Nitin Desai, BS, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Danielle Nacamuli, BS, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Kent M. Koprowicz, Seattle, WA (*Abstract Co-Author*) Research Consultant, Axio Research, LLC
Achille Mileto, MD, Seattle, WA (*Abstract Co-Author*) Research grant, General Electric Company;
Carolyn L. Wang, MD, Seattle, WA (*Abstract Co-Author*) Research Grant, General Electric Company

PURPOSE

To combine perfusion CT with routine multi-phase contrast-enhanced CT on a 256-slice scanner to evaluate the significance of perfusion parameters in patients with pancreatic ductal adenocarcinoma (PDA).

METHOD AND MATERIALS

CT perfusion was added to routine baseline and follow-up CT scans with fifteen perfusion acquisitions obtained 5-42.5 sec after contrast administration, followed by standard pancreatic arterial and portal venous phases using the same IV contrast injection. Regions of interest (ROIs) were drawn for the center, rim, and entire tumor to generate perfusion maps from which tumor blood volume (BV), blood flow (BF), and permeability surface area product (PS) were calculated using deconvolution algorithms. Tumor size, RECIST 1.1 response, and carbohydrate antigen 19-9 (CA 19-9) were obtained at baseline and follow-up. Pearson correlation coefficients were used to compare perfusion parameters to clinical variables at both timepoints. Radiation dose was recorded, and size specific dose estimate (SSDE) was calculated.

RESULTS

Twenty-five patients with PDA were included (15 m,10 f; 64 ± 10 years). Mean baseline tumor BV was 2.5 ± 1.5 ml/100g, BF was 19.7 ± 10.1 ml/100g/min, PS was 7.9 ± 7.6 ml/100g/min. Mean follow-up tumor BV was 2.3 ± 1.5 ml/100g, BF was 16.4± 9.1 ml/100g/min, PS was 7.9 ± 7.6 ml/100g/min. Per RECIST 1.1, 3 patients had Partial Response, 12 patients had Stable Disease, and 10 had Progressive Disease. There was a significant negative correlation between mean tumor BV at baseline and follow-up sum of diameters (-.51, p=<0.05), RECIST response (-0.44, p=<0.05), longest tumor diameter (-0.41, p=<0.05) and CA 19-9 (-0.49, p= <0.05). There was also a negative correlation between change in tumor BV from baseline to follow-up but did not reach statistical significance. For the perfusion sequence, CTDIvol was 41± 5 mGy and SSDE was 54 ± 8 mGy.

CONCLUSION

A perfusion sequence added to routine pancreatic CT provides added quantitative information that negatively correlates with other clinical metrics. Lower perfusion parameters at baseline correlated with worse follow-up outcomes, of which tumor BV reached statistical significance. Routinely adding perfusion CT to standard pancreatic CTs could add quantitative information to stratify tumors at baseline and predict treatment response.

CLINICAL RELEVANCE/APPLICATION

Using CT perfusion in conjunction with routine pancreas CT is a novel way to comprehensively characterize PDA at baseline and add metrics that may be used to predict individual response to therapy.

RC209-05 Challenges in Pancreatic Cancer Staging

Monday, Dec. 2 9:20AM - 9:40AM Room: E353C

Participants
Eric P. Tamm, MD, Houston, TX (*Presenter*) Institutional Research Grant, General Electric Company

LEARNING OBJECTIVES

1) To be able to identify and describe common challenges encountered in staging pancreatic cancer. 2) To be able to manage these challenges, whether through imaging techniques/modalities or interpretation/reporting. 3) To be able to make recommendations to clinicians.

RC209-06 Apparent Diffusion Coefficient (ADC) Allows Early Prediction of Response After Prophylactic DC Caccination for Pancreatic Ductal Adenocarcinoma (PDAC) Prevention

Monday, Dec. 2 9:40AM - 9:50AM Room: E353C

Participants
Junjie Shangguan, Chicago, IL (*Presenter*) Nothing to Disclose
Liang Pan, MD, Changzhou, China (*Abstract Co-Author*) Nothing to Disclose
Matteo Figini, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Chong Sun, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Jia Yang, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Quanhong Ma, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Aydin Eresen, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Yu Li, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Yuri Velichko, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Zhuoli Zhang, MD,PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Vahid Yaghmai, MD, Orange, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

junjie.shangguan@northwestern.edu

PURPOSE

We evaluated ADC as an imaging biomarker for prediction of response to prophylactic DC vaccination in Panc02 inoculated mice, a model of pancreatic ductal adenocarcinoma (PDAC).

METHOD AND MATERIALS

All animal protocols were approved by the institutional animal care and use committee. 20 mice were randomly assigned to treatment or control groups. Animals underwent 3 intraperitoneal injections of DC vaccines, unpulsed mature DCs, Panc02 lysates, or no treatment. All mice underwent tumor induction by Panc02 cell injection into the pancreas, followed by weekly MRI scans. ADC was calculated from DW-MRI using MatLab. ΔADC is calculated by ΔADC=ADC3w-ADC1w. Tumor tissue was collected for histology. Statistical analysis was performed on GraphPad Prism. Receiver operating characteristic (ROC) was generated with a survival 2 standard deviations higher than average untreated animal survival considered to be positive survival events.

RESULTS

ΔADC of DC-vaccine group was significantly higher than in control groups and correlated with diminished tumor volume, survival, and % interstitial collagen on histology, suggesting that ΔADC had direct correlations with tumor pathology. Prophylactic IP DC-vaccination also induced a strong anti-tumor immune response in vivo, decreased tumor volume, and prolonged survival. For ROC, survival > 49 d was considered positive events. Distance analysis (d = 0.316) and Youden indexing (0.6) showed that optimal cutoff values were -8.52x10-5 (specificity = 0.9 and sensitivity = 0.7) and -9.24x10-5 (specificity = 0.7 and sensitivity = 0.9). Diagnostic odds ratio was 2.33.

CONCLUSION

ΔADC can predict response to prophylactic DC vaccination via IP injection in a Panc02 mouse model of pancreatic cancer.

CLINICAL RELEVANCE/APPLICATION

Here, we showed that ADC is a clinically translatable tool that allows early prediction of response to DC vaccination for PDAC treatment, facilitating timely therapy adjustment in individual patients.

RC209-07 Imaging Workup of Cystic Pancreatic Lesions

Monday, Dec. 2 10:20AM - 10:40AM Room: E353C

Participants
Koenraad J. Mortele, MD, Boston, MA (*Presenter*) Nothing to Disclose

RC209-08 Intraductal Pancreatic Mucinous Neoplasm with Main Duct Involvement: How Ominous are the Current Worrisome Features and High-Risk Stigmata?

Monday, Dec. 2 10:40AM - 10:50AM Room: E353C

Participants
Alejandro Garces-Descovich, MD, Boston, MA (*Presenter*) Nothing to Disclose
Khoschy Schawkat, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Elena L. Resnick, MD, Portland, ME (*Abstract Co-Author*) Nothing to Disclose
Jonathan N. Glickman, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Alexander Brook, PhD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Koenraad J. Mortele, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

alejandrogarcesmd@gmail.com

PURPOSE

To evaluate the "worrisome features" (WF) and "high-risk stigmata" (HRS) of pathologically resected main duct-IPMN (MD-IPMN) and combined duct-IPMN (CD-IPMN) and correlate the imaging features with their clinical presentation, laboratory values, and histopathological features.

METHOD AND MATERIALS

Of 187 consecutive patients with endoscopic ultrasound and pancreatic surgical resection from February 2004 to July 2017, 101 had histopathologically proven IPMN. Pathological examination revealed 87 cases of MD/CD-IPMN. Thirteen patients were excluded due to unavailability of imaging (n=12), and history of prior surgery (n=1). For the remaining 74 patients (42 women; mean age: 67.2±10.4 years), high-resolution cross-sectional imaging (3 MRI; 26 MRI + MRCP; 45 MDCT imaging) were retrospectively assessed

by three radiologists. Each WF and HRS accordingly to the current IPMN guidelines [International Association of Pancreatology (IAP), American Gastroenterological Association (AGA), and American College of Radiology (ACR)] were assessed in imaging and correlated with pathologic findings for high-grade dysplasia (HGD) and invasive carcinoma (IC). Preoperative growth rate was assessed in 17 patients. Fisher-Exact test was used for the analysis between the guidelines features and dichotomized values of histopathology [1) low/intermediate dysplasia and 2) HGD/IC].

RESULTS

Of 74 patients, 13 (18%) had HGD and 10 (13%) had IC arising from the MD/CD-IPMN. No significant association between HGD/IC and WF or HRS from any of the three guidelines was found. From the IAP, WF were found in 57 (77%) patients and HRS in 40 (53%) patients (p=0.99 and p=0.21, respectively). Accordingly to the AGA, HRS were found in 64 (86%) patients (p=0.71). Finally, following the ACR guidelines, WF were found in 56 (77%) patients and HRS in 40 (54%) patients (p=0.99 and p=0.22, respectively). Clinical signs and laboratory values were also insignificant (p=0.12).

CONCLUSION

The radiological WF and HRS form the three most used current guidelines (IAP, AGA, and ACR) for diagnosis and treatment of MD/CD-IPMN do not correlate with histopathological high-grade dysplasia or invasive carcinoma.

CLINICAL RELEVANCE/APPLICATION

Radiologists, surgeons and gastroenterologists should be aware that the current guidelines (IAP, AGA and ACR) for the management of IPMNs are not applicable to IPMNs with main duct involvement.

RC209-09 Clinical Feasibility of Abbreviated MR with 3D-Breath Hold Magnetic Resonance Cholangiography for Surveillance of Pancreatic IPMN

Monday, Dec. 2 10:50AM - 11:00AM Room: E353C

Participants
Hyo-Jin Kang, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Dong Ho Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jeongin Yoo, Seoul, 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 determine the clinical feasibility of abbreviated MRI using breath-hold 3D-MRCP (aMRI-BH) for pancreas IPMN surveillance compared to conventional contrast-enhanced pancreatobiliary MRI (cMRI).

METHOD AND MATERIALS

This retrospective study includes 123 patients with 159 pancreatic IPMNs (pathologically proven [n=74], typical image feature with more than 2-year stability [n=85]) who underwent contrast-enhanced pancreatobiliary MRI with conventional and breath-hold 3D-MRCP. Two readers independently evaluated: 1) aMRI-BH, consisted of heavily T2W, BH-3D-MRCP, pre-contrast T1W and DWI, and 2) cMRI, consisted of aMRI-BH plus 2D-MRCP, conventional 3D-MRCP and contrast enhanced dynamic sequences. Diagnostic performance and recommended further management plan were compared by evaluating high-risk stigmata and worrisome features based on revised Fukuoka guideline. A mural nodule >= 5mm without enhancement information defined as suspicious finding for high risk stigmata. Inter-protocols and inter-observer agreement of image features using ICC and κ statistics and the ROC curve analysis for diagnostic performance were used.

RESULTS

The total acquisition time of cMRI and aMRI-BH were 32.7±8 and 6.5±2.1 min, respectively (P<0.01). Among 159 IPMNs, 25(15.7%) lesions were invasive carcinomas and 7(4.4%) lesions were high grade dysplasia. Of these 32 malignant lesions, cMRI enabled to present more high risk stigmata than aMRI-BH (75% and 34.3% in each). However, 65.6% lesions further revealed mural nodules >= 5mm in aMRI-BH and finally no differences were found for revealing high risk or suspicious high risk stigmata between protocols (75.0% and 76.6% in cMRI and aMRI-BH). Diagnostic performance for detecting malignant IPMN was comparable (AUC, 0.85-0.90 in cMRI and 0.87-0.90 in aMRI-BH, Ps>0.05) with substantial inter-protocols and inter-observer agreements for assessing high risk stigmata and worrisome features (ICC, 0.88-0.95; κ, 0.57-0.95) except thickened cyst wall and lymphadenopathy. All malignant IPMNs evaluated by aMRI-BH were assessed as strongly requiring further work-up.

CONCLUSION

An aMRI using breath-hold 3D-MRCP showed comparable diagnostic performance in capturing suspicious findings of high risk stigmata for IPMN and in determining the immediate action is needed or not, compared to cMRI.

CLINICAL RELEVANCE/APPLICATION

An aMRI consist of heavily T2W, BH-3D-MRCP, pre-contrast T1W and DWI might be clinically feasible for pancreatic IPMN surveillance while escaping high time-cost and cumulative CT radiation hazard.

RC209-10 Pancreatic Neuroendocrine Tumors

Monday, Dec. 2 11:00AM - 11:20AM Room: E353C

Participants
Desiree E. Morgan, MD, Birmingham, AL (*Presenter*) Institutional Research Grant, General Electric Company; Consultant, General Electric Company

For information about this presentation, contact:

dmorgan@uabmc.edu

LEARNING OBJECTIVES

1) Identify imaging features of pancreatic endocrine tumors that differentiate it from pancreatic ductal adenocarcinoma. 2)

Compare appearances of pancreatic endocrine tumors on different imaging modalities and specify clinical utility of the different imaging modality choices. 3) Understand updated Word Health Organization grading and implications for staging and treatment of pancreatic endocrine tumors.

RC209-11 Radiomics Analysis Based on Diffusion Kurtosis Imaging and T2 Weighted Imaging for Differentiation of Pancreatic Neuroendocrine Tumors from Solid Pseudopapillary Tumors

Monday, Dec. 2 11:20AM - 11:30AM Room: E353C

Participants
Yan-jie Shi, Beijing, China (*Presenter*) Nothing to Disclose
Haitao Zhu, PhD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Xiao-Yan Zhang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Ying-shi Sun, MD,PhD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

shiyanjie2018@126.com

PURPOSE

To develop and validate a radiomics model of diffusion kurtosis imaging (DKI) and T2 weighted imaging for discriminating pancreatic neuroendocrine tumors (PNET) from solid pseudopapillary tumors (SPT)

METHOD AND MATERIALS

57 patients with histopathological confirmed PNET (n=25) and SPT (n=32) were enrolled in this study. All the patients underwent T2-weighted and diffusion-weighted imaging at 3T MRI. DW imaging were obtained using single-shot echo-planar imaging with 10 b-values (0, 20, 50, 100, 200, 600, 800, 1000, 1200 and 1500 s/mm2). ROIs of tumors were manually drawn on each slice at T2 weighted images and DWI (b=1500 s/mm2) independently by two observers. Intraclass correlation coefficients were used to evaluate the interobserver agreement. Mean diffusivity (MD) and mean kurtosis (MK) were derived from DKI approach. The two-sample t test and the least absolute shrinkage and selection operator regression were used for feature selection at DKI and T2 weighted images. Receiver operating characteristic (ROC) analysis was performed and diagnostic accuracy was calculated.

RESULTS

Satisfactory interobserver agreement was achieved. MD and MK had good diagnostic performance with area under curve (AUC) of 0.732 (95% confidence interval, 0.598-0.841) and 0.650 (95% CI, 0.512-0.772). 10 radiomic features extracted from T2 weighted imaging and DKI showed excellent discrimination performance with AUC of 0.94 (95% CI, 0.844-0.986). The radiomics model had better diagnostic performance than that of MD (Z=3.445, P=0.0006) and MK (Z=3.761, P=0.0002) in 57 patients. The radiomics model, which comprising DKI and T2 weighted imaging, showed excellent differentiation with AUC of 0.950 (95% CI, 0.839-0.993), sensitivity of 94.12% (95% CI, 71.3-99.9%), specificity of 85.19% (95% CI, 66.3-95.8%) in the primary cohort (PNET=17 and SPT=27). Using this model to differentiate PNET and SPT had AUC of 0.925 (95% CI, 0.624 -0.998), sensitivity of 100% (95% CI, 63.1-100%), specificity of 80% (95% CI, 24-99.5%) in the validation cohort (PNET=8 and SPT=5).

CONCLUSION

Radiomics model based on DKI and T2 weighted imaging may be more valuable than MD and MK for discriminating PNET and SPT. This model could improve the diagnostic accuracy of differentiating PNET and SPT.

CLINICAL RELEVANCE/APPLICATION

Radiomics analysis could improve the diagnostic accuracy and contribute to determining an appropriate treatment strategy for pancreatic tumors.

RC209-12 Best CNR Curve-Guided keV Selection of Virtual Mono-Energetic Image Reconstruction for Necrosis Depiction in Acute Pancreatitis

Monday, Dec. 2 11:30AM - 11:40AM Room: E353C

Participants
Yuan Yuan, Chengdu, China (*Presenter*) Nothing to Disclose
Zixing Huang, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose
Zhenlin Li, MD, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose
Bin Song, MD, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose
Liping Deng, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose
Kai Liao, Chengdu , China (*Abstract Co-Author*) Nothing to Disclose
Xinyue Chen, London , United Kingdom (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the feasibility of using best CNR curve from dual-energy post-processing for necrosis depiction in acute pancreatitis by comparing the conspicuity and image quality with 100kVp, Sn140kVp and mixed imaging that was routinely used for clinical interpretation.

METHOD AND MATERIALS

48 patients of acute pancreatitis with proven necrosis (24 male and 24 female), who underwent dual-energy (100 kVp and Sn140 kVP) CT acquisition in venous phase between March 2015 and January 2016, were retrospectively enrolled in the study. The median age was 46 years. Three imaging series (100kVp, Sn140kVp and mixed imaging) were reconstructed automatically after acquisition. In addition keV that gives the peak value of CNR demonstrated on the Best CNR curve derived from dual-energy post-processing workstation is used to reconstruct the mono-energetic imaging. Two blinded radiologists evaluated 100kVp, Sn140kVp, mixed imaging and Best CNR based-keV imaging and grading the necrosis conspicuity in 4-point scale on a per-necrosis basis. Image quality (Noise and SNR) was assessed, and overall image preference was ranked as a per-patient basis. Necrosis-to-parenchymal contrast-to-noise ratio (CNR) was compared between 4 imaging series. ANOVA and bonferroni correction were used to do statistic analysis.

RESULTS

The mean keV suggested by best CNR curve was 75keV (range:74~78keV). The inter-reader agreement was excellent for necrosis conspicuity (ICC: 0.716). Across two readers, the conspicuity rating for Best-CNR curve based mono-energetic imaging was superior to other imaging series ($p<0.001$). Besides its SNR is also significant higher in mono-energetic imaging than other imaging series ($p<0.0001$) with least noise shown as 9.31±2.96. CNR was significant higher in best-CNR based keV mono-energetic imaging (9.99±5.86), superior to all the other series ($p<0.001$).

CONCLUSION

It is demonstrated in the study that the best CNR curve based keV mono-energetic imaging has better conspicuity and imaging quality for necrosis depiction in acute pancreatitis compared to routinely automatically reconstructed imaging series.

CLINICAL RELEVANCE/APPLICATION

Since the necrosis is illustrated to be the most serious morphologic findings closely relating to mortality, it is crucial to have a correct assessment of it in acute pancreatitis. After the advent of dual-energy CT, best-CNR curve guided selection of keV was validated to be a convenient and feasible way.

RC209-13 Acute Pancreatitis Reporting

Monday, Dec. 2 11:40AM - 12:00PM Room: E353C

Participants
Bhavik N. Patel, MD, Fremont, CA (*Presenter*) Speakers Bureau, General Electric Company; Research Grant, General Electric Company

LEARNING OBJECTIVES

1) Be familiar with different types of acute pancreatitis and their associated complications. 2) Understand the revised Atlanta classification terminology.

RC229

Abbreviated Liver MRI

Monday, Dec. 2 8:30AM - 10:00AM Room: N228

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

LEARNING OBJECTIVES

1) To define the objective of abbreviated MRI protocols from a cost-effectiveness standpoint. 2) To outline a conceptual framework for evaluating the cost-effectiveness of an abbreviated liver MRI protocol. 3) To project how different factors related to the test performance and cost of an abbreviated liver MRI protocol are likely to shape its downstream value. 4) Select patients in whom abbreviated MRI is indicated for quantitative evaluation of diffuse liver disease. 5) Build an abbreviated MRI examination protocol for diffuse liver disease evaluation. 6) Interpret quantitative imaging biomarker maps (fat, iron, and fibrosis) of the liver and generate a clinical report. 7) Explain the essential sequences required within an abbreviated protocol for the detection of liver metastases. 8) Compare the diagnostic performance of an abbreviated protocol versus standard multiparametric liver protocol for the assessment of colorectal liver metastases. 9) Identify pitfalls / challenges for the abbreviated liver protocol. 10) Review current guidelines for liver cancer screening. 11) Review the current options for abbreviated MRI protocol and early results for liver cancer screening.

Sub-Events

RC229A Cost Evaluation of Abbreviated Liver MRI Protocols

Participants
Pari V. Pandharipande, MD, MPH, Chestnut Hill, MA (*Presenter*) Research Grant, Medical Imaging & Technology Alliance

For information about this presentation, contact:

pari@mgh-ita.org

LEARNING OBJECTIVES

1) To define the objective of abbreviated MRI protocols from a cost-effectiveness standpoint. 2) To outline a conceptual framework for evaluating the cost-effectiveness of an abbreviated liver MRI protocol. 3) To project how different factors related to the test performance and cost of an abbreviated liver MRI protocol are likely to shape its downstream value.

RC229B Abbreviated Liver Protocol in Diffuse Liver Disease

Participants
Takeshi Yokoo, MD, PhD, Dallas, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Takeshi.Yokoo@UTSouthwestern.EDU

LEARNING OBJECTIVES

1) Select patients in whom abbreviated MRI is indicated for quantitative evaluation of diffuse liver disease. 2) Build an abbreviated MRI examination protocol for diffuse liver disease evaluation. 3) Interpret quantitative imaging biomarker maps (fat, iron, and fibrosis) of the liver and generate a clinical report.

RC229C Abbreviated Liver Protocol in Metastatic Disease

Participants
Angela M. Riddell, MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Explain the essential sequences required within an abbreviated protocol for the detection of liver metastases. 2) Compare the diagnostic performance of an abbreviated protocol versus standard multiparametric liver protocol for the assessment of colorectal liver metastases. 3) Identify pitfalls / challenges for the abbreviated liver protocol.

RC229D Abbreviated Liver Protocol for HCC Screening and Surveillance

Participants
Bachir Taouli, MD, New York, NY (*Presenter*) Research Grant, Bayer AG; Research Grant, Takeda Pharmaceutical Company Limited; Research Grant, Regeneron Pharmaceuticals, Inc; Consultant, Alexion Pharmaceuticals, Inc; Consultant, Bayer AG; ;

For information about this presentation, contact:

bachir.taouli@mountsinai.org

LEARNING OBJECTIVES

1) Review current guidelines for liver cancer screening. 2) Review the current options for abbreviated MRI protocol and early results for liver cancer screening.

ABSTRACT

Hepatocellular carcinoma (HCC) is the 2nd leading cause of cancer-related death worldwide, and the fastest growing cause of cancer death in the USA. The most important risk factor for HCC is cirrhosis. In this presentation, we will discuss the performance of ultrasound for HCC screening and surveillance and we will review recent developments in the use of abbreviated MRI protocols for HCC screening and surveillance.

RC229E Round Table Discussion

Participants
Pari V. Pandharipande, MD, MPH, Chestnut Hill, MA (*Presenter*) Research Grant, Medical Imaging & Technology Alliance
Takeshi Yokoo, MD, PhD, Dallas, TX (*Presenter*) Nothing to Disclose
Angela M. Riddell, MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose
Bachir Taouli, MD, New York, NY (*Presenter*) Research Grant, Bayer AG; Research Grant, Takeda Pharmaceutical Company Limited; Research Grant, Regeneron Pharmaceuticals, Inc; Consultant, Alexion Pharmaceuticals, Inc; Consultant, Bayer AG; ;

Printed on: 10/29/20

SPAI21

RSNA AI Deep Learning Lab: Beginner Class: Classification Task (Intro)

Monday, Dec. 2 10:30AM - 12:00PM Room: AI Showcase, North Building, Level 2, Booth 10342

AI BR CH CT GI HN IN MR NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Board of Directors, VoiceIt Technologies, LLC; Stockholder, VoiceIt Technologies, LLC; Board of Directors, FlowSigma, LLC; Officer, FlowSigma, LLC ; Stockholder, FlowSigma, LLC

Special Information

In order to get the best experience for this session, it is highly recommended that attendees bring a laptop with a keyboard and decent-sized screen. Having a Gmail account will be helpful. Here are instructions for creating and deleting a Gmail account. Here are instructions for creating and deleting a Gmail account.

ABSTRACT

This class will focus on basic concepts of convolutional neural networks (CNNs) and walk the attendee through a working example. A popular training example is the MNIST data set which consists of hand-written digits. This course will use a data set we created, that we call 'MedNIST', and consists of images of 6 different classes: Chest X-ray, Chest CT, Abdomen CT, Head CT, Head MR and Breast MRI. The task is to identify the image class. This will be used to train attendees on the basic principles and some pitfalls in training a CNN. • Intro to CNNs • Data preparation: DICOM to jpeg, intensity normalization, train vs test • How do we choose the labels? Inconsistencies... Use Fast.AI routines to classify; Validation of results: Are the performance metrics reliable? 'Extra Credit': if there is time, explore data augmentation options, effect of batch size, training set size.

Printed on: 10/29/20

SSC05

Gastrointestinal (Hepatocellular Carcinoma)

Monday, Dec. 2 10:30AM - 12:00PM Room: N228

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Mustafa R. Bashir, MD, Cary, NC (*Moderator*) Research Grant, Siemens AG; Research Grant, NGM Biopharmaceuticals, Inc; Research Grant, Madrigal Pharmaceuticals, Inc; Research Grant, Metacrine, Inc; Research Grant, Pinnacle Clinical Research; Research Grant, ProSciento Inc; Research Grant, Carmot Therapeutics; Research Grant, 1Globe Health Institute; Research Consultant, ICON plc;
Kristin K. Porter, MD,PhD, Baltimore, MD (*Moderator*) Stockholder, Pfizer Inc; Advisory Board, Bracco Group
Mishal Mendiratta-Lala, MD, Ann Arbor, MI (*Moderator*) Nothing to Disclose

Sub-Events

SSC05-01 How Frequently Does HCC Develop in At-Risk Patients with a Negative Liver MRI Examination?

Monday, Dec. 2 10:30AM - 10:40AM Room: N228

Participants
Islam H. Zaki, MBBCh, Durham, NC (*Presenter*) Nothing to Disclose
Erin Shropshire, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Shuaiqi H. Zhang, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Benjamin Wildman-Tobriner, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Daniele Marin, MD, Durham, NC (*Abstract Co-Author*) Research support, General Electric Company
Rajan T. Gupta, MD, Durham, NC (*Abstract Co-Author*) Consultant, Bayer AG; Speakers Bureau, Bayer AG; Consultant, Invivo Corporation; Consultant, C. R. Bard, Inc
Alaattin H. Erkanli, PhD, Durham , NC (*Abstract Co-Author*) Nothing to Disclose
Rendon C. Nelson, MD, Durham, NC (*Abstract Co-Author*) Consultant, VoxelMetrix, LLC; Co-owner, VoxelMetrix, LLC; Advisory Board, Bracco Group; Advisory Board, Guerbet SA; Speakers Bureau, Bracco Group; Royalties, Wolters Kluwer nv
Mustafa R. Bashir, MD, Cary, NC (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, NGM Biopharmaceuticals, Inc; Research Grant, Madrigal Pharmaceuticals, Inc; Research Grant, Metacrine, Inc; Research Grant, Pinnacle Clinical Research; Research Grant, ProSciento Inc; Research Grant, Carmot Therapeutics; Research Grant, 1Globe Health Institute; Research Consultant, ICON plc;

For information about this presentation, contact:

Islam.Zaki@duke.edu

PURPOSE

Guidelines for hepatocellular carcinoma (HCC) screening typically recommend imaging surveillance at 6 month intervals. For patients who undergo US screening and have a liver MRI for other reasons, or are screened with MRI due to poor quality US (obesity or hepatic steatosis), a longer interval after may be appropriate. The purpose of this study was to determine the rate of development of significant liver lesions after a negative MRI in a screening population.

METHOD AND MATERIALS

This retrospective study included patients from 2013 at risk of developing HCC, who underwent MRI surveillance, with follow up CTs or MRIs for at least 12 months read using the Liver Imaging and Reporting Data System (LI-RADS)[3]. Patients with baseline focal liver lesions categorized not LR-1, history of primary liver cancer, prior treatment of a liver lesion, or liver transplant were excluded. All available CTs and MRIs that were compliant with the LI-RADS technical guidelines were included in the follow-up assessment. Follow-up examinations were classified as negative (no lesions or only LR-1 lesions) or positive (at least one observation of any category other than LR-1). Time to first positive examination and observation types were recorded.

RESULTS

204 patients (mean age 58 ± 11 years, 128 women, 168 patients with cirrhosis, most with non-alcoholic steatohepatitis (n=117), were included. Median follow up duration was 28 (range 12-60) months. 5.9% (12/204) of patients developed a lesion at follow-up ("became positive"). At 6-9 months, one patient (0.5%, 1/204) became positive, with new LR-3 nodules measuring up to 11 mm. At 12±3 months, three additional patients (cumulative 2%, 4/204) became positive: a 12 mm LR-3 nodule, a 10 mm LR-4 nodule, and a 29 mm LR-M nodule. By two years, two additional patients became positive with LR-3 nodules.

CONCLUSION

Clinically significant (LR-4, LR-5, LR-M) liver nodules develop in a minority (1%) of patients in the first year following negative MRI. While ongoing surveillance is necessary, after a negative MRI it may be reasonable to perform the screening imaging at 1 year.

CLINICAL RELEVANCE/APPLICATION

In patients at risk for HCC with a negative MRI, the next imaging surveillance for HCC could be delayed until one year after the MRI

SSC05-02 Hepatobiliary Phase Hypointense Nodule without Arterial Phase Hyperenhancement on Gadoxetic Acid-Enhanced MRI: Risk of HCC Intrahepatic Distant Recurrence after Radiofrequency Ablation or

Hepatectomy: A Systematic Review and Meta-Analysis

Monday, Dec. 2 10:40AM - 10:50AM Room: N228

Participants
Tae-Hyung Kim, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Sungmin Woo, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sangwon Han, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Chong Hyun Suh, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Dong Ho Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jeong Min Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Grant, Bayer AG; Speaker, Bayer AG; Grant, Canon Medical Systems Corporation; Grant, Koninklijke Philips NV; Grant, General Electric Company; Grant, Guerbet SA; Speaker, Guerbet SA; Grant, Samsung Electronics Co, Ltd; Speaker, Samsung Electronics Co, Ltd; Grant, Bracco Group; Speaker, Siemens AG

For information about this presentation, contact:

kth1205@gmail.com

PURPOSE

To perform a systematic review and meta-analysis to determine intrahepatic distant recurrence (IDR) risk of hepatobiliary phase (HBP) hypointense nodules without arterial phase hyperenhancement (APHE) on pretreatment gadoxetic-acid enhanced MRI in patients with hepatocellular carcinoma (HCC) treated with either hepatectomy or radiofrequency ablation (RFA).

METHOD AND MATERIALS

Pubmed and EMBASE databases were searched up to April 6th 2019. We included studies that evaluated HBP hypointense nodules without APHE as risk factors for IDR in HCC patients treated with either hepatectomy or RFA. Hazard ratios (HR) were meta-analytically pooled using random-effects model. Subgroup analyses stratified to clinicopathologic variables were performed to explore heterogeneity. Methodological quality of included studies was assessed using Quality in Prognostic Studies (QUIPS) tool.

RESULTS

Eight studies with 842 patients were analyzed. The overall pooled HR for IDR was 2.44 (95% CI, 1.99-2.98) and were (2.14 (95% CI, 1.66-2.76) and 3.07 (95% CI, 2.19-4.31) for patients that underwent hepatectomy and RFA, respectively. No significant heterogeneity was present (I2 = 0%). The presence of these nodules was consistently shown to be significant factors for IDR in other subgroups (HR = 1.74-3.07). Study quality was generally moderate.

CONCLUSION

HBP hypointense nodules without APHE are risk factors for IDR in HCC patients treated with either RFA or hepatectomy. Stratification of patient management with regard to performing additional tests or treatment for these nodules and modification of proper follow-up strategies may be required in patients with HCC who have these nodules on pretreatment gadoxetic acid-enhanced MRI.

CLINICAL RELEVANCE/APPLICATION

HBP nodules without APHE in pretreatment gadoxetic acid-MR should be recognized as a significant risk factor for increased IDR after curative treatment for HCCs and therefore, it may require stratification of patient management with regard to deciding whether to perform additional pathologic test or treatment to these nodules and modification of proper follow-up strategies after curative treatment for HCCs in patients who harbor these nodules.

SSC05-03 Prospective Intraindividual Comparison of CT, MRI with Extracellular Contrast and Gadoxetic Acid for Diagnosis of HCC

Monday, Dec. 2 10:50AM - 11:00AM Room: N228

Participants
Ji Hye Min, MD, PhD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Young Kon Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jeong Eun Lee, Daejeon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Kyung-Sook Shin, MD, Daejeon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yeun-Yoon Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Dong Ik Cha, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

minjh1123@gmail.com

PURPOSE

We prospectively evaluated the diagnostic performance of computed tomography (CT), magnetic resonance imaging (MRI) with extracellular contrast agents (ECA-MRI), and MRI with hepatobiliary agents (HBA-MRI) for the diagnosis of hepatocellular carcinoma (HCC) using the Liver Imaging Reporting and Data System (LI-RADS) with pathological confirmation.

METHOD AND MATERIALS

Between November 2016 and February 2019, we enrolled 125 patients with chronic liver disease who underwent CT, ECA-MRI, and HBA-MRI within one month before surgery for initial hepatic nodules detected via ultrasound. Two radiologists evaluated the presence of major and ancillary HCC features and assigned LI-RADS categories (v2018) based on CT and MRI. We then compared the diagnostic performance for LR-5 for each modality alone and in combination.

RESULTS

In total, 163 observations (124 HCCs, 13 non-HCC malignancies, and 26 benign lesions; mean size, 20.7 mm) were identified. ECA-MRI showed a higher rate of identifying arterial phase hyperenhancement (16.1% and 8.1%), washout (5.6% and 6.5%), and enhancing capsule (51.6% and 44.4%) compared with CT and HBA-MRI, respectively. ECA-MRI showed better sensitivity and

accuracy (83.1% and 86.5%) than either CT (63.7% and 71.8%) or HBA-MRI (69.4% and 76.1%), while all imaging modalities achieved 97.4% specificity. When combining CT with ECA-MRI or HBA-MRI, sensitivity (89.5% and 83.1%) and accuracy (91.4% and 86.5%) were increased compared with CT alone.

CONCLUSION

ECA-MRI showed better sensitivity and accuracy than CT or HBA-MRI for the diagnosis of HCC with LI-RADS. We achieved better diagnostic performance when applying CT in combination with one of the two MRI compared with CT alone.

CLINICAL RELEVANCE/APPLICATION

Our study confirms that significant discrepancy of HCC imaging features across the imaging modality, and clinicians need to select the appropriate imaging modality for their preferred sensitivity/specificity trade off.

SSC05-04 Long-Term Evolution of Hepatocellular Adenomas at MR Imaging Follow-Up

Monday, Dec. 2 11:00AM - 11:10AM Room: N228

Awards
Trainee Research Prize - Fellow

Participants
Federica Vernuccio, MD, Palermo, Italy (*Presenter*) Nothing to Disclose
Maxime Ronot, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Marco Dioguardi Burgio, MD, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Francois Cauchy, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Dominique-Charles Valla, Clichy, France (*Abstract Co-Author*) Liver Safety Committee, Agomelatine
Safi Dokmak, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Jessica Zucman-Rossi, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Valerie Paradis, MD, Clichy, France (*Abstract Co-Author*) Nothing to Disclose
Valerie Vilgrain, MD, Paris, France (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

federicavernuccio@gmail.com

PURPOSE

Hepatocellular adenomas (HCAs) are rare benign liver tumors. Guidelines recommend continued surveillance for patients diagnosed with HCAs, but these recommendations are mainly based on uncontrolled studies or experts' opinion. The aims of this study were to analyze the long-term course of evolution of HCAs including solitary and multiple lesions, and to identify predictive features of progression.

METHOD AND MATERIALS

In a retrospective cohort study performed at a tertiary care hospital, we included 118 patients (mean 40±10 years old) with HCAs proven at biopsy or surgery: 41 patients had solitary HCAs and 77 patients had multiple HCAs. Imaging follow-up with MR was analyzed and tumor evolution was evaluated using the Response Evaluation Criteria in Solid Tumors (RECISTv1.1) thresholds.

RESULTS

Median follow-up of the entire study population was 5.0 years. Overall, 37/41 (90%) solitary HCAs and 55/77 (71%) patients with multiple HCAs showed stable or regressive disease (i.e. >30% size decrease). After resection of solitary HCAs, new lesions appeared only in 2/29 (7%) patients, both with HCAs at-risk of malignancy. In the multiple HCAs cohort, HNF-1A inactivated HCAs showed a higher rate of progression compared to inflammatory HCAs (11/26 [42.3%] vs. 7/37 [18.9%], p = 0.043), lower use of oral contraceptives (28/32 [87.5%] vs. 45/45 (100%), p =0.027) and lesser duration of oral contraception intake (mean 12.0 years ± 7.5 vs. 19.2 years ± 9.2, p = 0.001).

CONCLUSION

Seventy-eight percent of HCAs showed long-term stability or size regression. After resection of solitary HCAs, tumor progression occurred only in HCAs at-risk of malignancy. Patients with multiple HCAs were more likely to show progressive disease, with HNF-1 A inactivated HCAs being the most common subtype showing progression.

CLINICAL RELEVANCE/APPLICATION

This is the first study demonstrating the long-term evolution of hepatocellular adenomas (HCAs). In patients with resected solitary HCAs, surveillance may be potentially discontinued after resection, except in case of ß-catenin mutated HCAs or foci of malignancy within the tumor. In patients with multiple HCAs, progressive disease may occur in up to 31% of cases, and, therefore, continued surveillance is suggested regardless of surgery.

SSC05-05 Clinical Outcomes of Patients with Elevated Alpha-Fetoprotein Level but Negative CT or MRI Findings in the Post-Treatment Surveillance After Curative-Intent Surgery or Radiofrequency Ablation for Hepatocellular Carcinoma

Monday, Dec. 2 11:10AM - 11:20AM Room: N228

Participants
Jihyuk Lee, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Ijin Joo, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Dong Ho Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jeong Min Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Grant, Bayer AG; Speaker, Bayer AG; Grant, Canon Medical Systems Corporation; Grant, Koninklijke Philips NV; Grant, General Electric Company; Grant, Guerbet SA; Speaker, Guerbet SA; Grant, Samsung Electronics Co, Ltd; Speaker, Samsung Electronics Co, Ltd; Grant, Bracco Group; Speaker, Siemens AG

PURPOSE

To evaluate the outcomes of patients with elevated alpha-fetoprotein (AFP) but negative CT or MRI findings in the post-treatment surveillance after curative-intent surgery or radiofrequency ablation (RFA) for hepatocellular carcinoma (HCC) and to determine predictive factors for subsequent detectable recurrence.

METHOD AND MATERIALS

This single-center retrospective study analyzed 76 patients who presented elevated AFP (>=20 ng/mL) without detectable recurrence on concurrent CT or MRI during surveillance after receiving curative-intent surgery or RFA. Time to imaging progression (development of detectable recurrence) after initial event of AFP elevation was estimated by the Kaplan-Meier method and was compared using univariate Cox regression analysis according to following parameters: surgery versus RFA, AFP elevation >50 ng/mL, prior post-treatment AFP <20 ng/mL, and negative imaging results on CT versus MRI.

RESULTS

In patients with post-treatment AFP elevation but without detectable recurrence on concurrent CT or MRI, the median time to imaging progression was 7.0 months (95% confidence interval: 6.0~9.0 months). Of the 76 patients enrolled, 57 patients (75.0%) developed either intra-hepatic (n=55) or extra-hepatic (n=2) recurrence detected on the average 2.6th follow-up CT or MRI studies after a mean of 7.9 months, whereas the other 19 patients (25.0%) did not develop any recurrence during average 4.4th CT or MRI studies for a mean follow of 15.9 months. Patients with prior post-treatment AFP <20 ng/mL showed significantly shorter time to imaging progression than those without (median 6.0 versus 16.0 months, P=0.001), while no significant differences were found according to prior treatment options, AFP elevation degrees, and imaging modalities showing negative results (Ps>0.05).

CONCLUSION

Elevated AFP (>=20 ng/mL) but negative CT or MRI findings in the post-treatment surveillance for HCC was frequently associated with subsequent imaging detectable recurrence in a short-term period. In addition, interval increment of post-treatment AFP from <20 to >=20 ng/mL was a significant risk factor for early recurrence.

CLINICAL RELEVANCE/APPLICATION

Elevated AFP after HCC treatment requires intensive follow-up to timely detect tumor recurrence, even if imaging studies show negative results at the time of initial AFP elevation.

SSC05-06 Intra Individual Prospective Comparison of Extracellular and Hepatobiliary MR Contrast Agent for the Diagnosis of HCC

Monday, Dec. 2 11:20AM - 11:30AM Room: N228

Participants
Anita Paisant, Angers, France (*Presenter*) Nothing to Disclose
Maxime Ronot, MD, Clichy, France (*Presenter*) Nothing to Disclose
Frederic Oberti, MD,PhD, Angers, France (*Abstract Co-Author*) Nothing to Disclose
Jerome Lebigot, MD, Angers, France (*Abstract Co-Author*) Nothing to Disclose
Valerie Vilgrain, MD, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Christophe Aube, MD, PhD, Angers, France (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Hepato-biliary (HB) contrast agent became part of international guidelines for the non-invasive diagnostic of hepatocellular carcinoma (HCC). The aim of this study was to compare performances of MRI with extra-cellular contrast agent (ECA-MRI) to HB contrast agent (HBA-MRI) for the diagnostic of small HCCs in a face to face comparison.

METHOD AND MATERIALS

All patients gave written informed content and this prospective study was approved by IRB. Between August 2014 and October 2017, 172 patients with cirrhosis, each 1 to 3 nodules from 1 to 3 cm large, were included in 8 centers. All patients had both ECA-MRI and HBA-MRI within a month. The non-invasive diagnostic of HCC was made when nodule was hyper-vascularized at arterial phase (HA) with wash-out at portal phase (PP) and/or delayed phase for ECA-MRI, or PP and/or HB phase (HBP) for HBA-MRI. The Gold Standard was defined by a composite algorithm previously published (CHIC study).

RESULTS

225 nodules, among them 153 HCCs and 72 not HCCs, were included. Both MRI sensitivities were similar (71.2%). Specificity was 83.3% for ECA-MRI and 68.1% for HBA-MRI. Concerning HCCs: on ECA-MRI, 138 were HA, 84 had wash-out at PP and 104 at DP; on HBA-MRI, 120 were HA, 79 had wash-out at PP and 105 at HBP. For nodules from 2 to 3 cm, sensitivity and specificity were similar with respectively 70.9% and 75.0%. For nodules from 1 to 2 cm, specificity drop down to 66.1% for HBA-MRI vs 85.7% for ECA-MRI.

CONCLUSION

HBA-MRI specificity is lower than HCA-MRI for the diagnostic of small HCC on cirrhotic patients. These results must question about the proper use of HBA-MRI in algorithm for the non-invasive diagnostic of small HCCs.

CLINICAL RELEVANCE/APPLICATION

The use of HBA-MRI in international guidelines for the non-invasive diagnostic of HCC should be used with caution.

SSC05-07 Can Baseline MR Imaging Biomarkers Enhance Survival Prediction of Hepatocellular Carcinoma (HCC) Patients?

Monday, Dec. 2 11:30AM - 11:40AM Room: N228

Participants
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose

Sanaz Ameli, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Roya Rezvani Habibabadi, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Robert Grimm, Erlangen, Germany (*Abstract Co-Author*) Employee, Siemens AG Stockholder, Siemens AG Patent holder, Siemens AG
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Li Pan, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

maliyar1@jhmi.edu

PURPOSE

To evaluate role of baseline ADC and tumor margin as independent predictors of overall survival (OS) in HCC patients and assess how incorporating these variables to current staging systems may enhance survival prediction in these group of patients.

METHOD AND MATERIALS

In a retrospective IRB approved study clinical, laboratory and imaging parameters of 273 randomly selected HCC patients were collected. Cox regression model was utilized to identify parameters that were significantly related to survival. Patients were stratified based on BCLC and CLIP. Recursive partitioning test were applied on a test set of patients (70%) to identify the optimal cutoff of ADC in stratifying patient based on difference is survival. The estimated cutoff was validated on the validation set of patients. Binary ADC value (above or below the cutoff) and tumor margin were integrated in to BCLC and CLIP. Kaplan- Myer curves were drown and overall survival was measured for patients based on BCLC, CLIP, combined model of BCLC + ADC + margin and CLIP + ADC + margin. Predictive performance of each model was measured and compared using C statistical analysis.

RESULTS

At baseline, patients with Low tumor ADC and well- defined tumor margin (favorable imaging biomarkers) had longer survival compared with those with high ADC and ill-defined tumor margin (unfavorable imaging biomarkers) (median OS of 63 months and 6 months, respectively). Tumor ADC and tumor margin remained as the two strong independent predictors of survival in HCC patients after adjustment for other clinical variables. Incorporating ADC (at cutoff of 1390 × 106mm/s) and tumor margin into BCLC and CLIP improved performance of survival prediction by 10% in BCLC group (0.63 Vs 0.73; $p<0.001$) and 7% in CLIP group (0.68 vs 0.75; $p<0.001$), Table 1. Regardless of BCLC and CLIP stage patients with unfavorable ADC and TM had significantly shorter OS compared to patients with both favorable ADC and TM ($p<0.001$), Figure 1.

CONCLUSION

Incorporating ADC and tumor margin to currently used staging systems for HCC significantly improve prediction performance of these criteria. Also, it could potentially change prediction of OS regardless of patient clinical status.

CLINICAL RELEVANCE/APPLICATION

ADC and tumor margin are two imaging biomarkers that can improve prediction performance of current staging systems, help to better stratify patients at baseline and define optimized treatment plan for them

SSC05-08 Comparison of the Diagnostic Performance of Imaging Criteria for Early-Stage Hepatocellular Carcinoma on Gadoxetate Disodium-Enhanced MRI

Monday, Dec. 2 11:40AM - 11:50AM Room: N228

Participants
Jieun Byun, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Sang Hyun Choi, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jae Ho Byun, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
So Jung Lee, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
So Yeon 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
Yong Moon Shin, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Pyo Nyun Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

We aimed to compare the diagnostic performance of imaging criteria for early-stage hepatocellular carcinoma (HCC) on gadoxetate disodium-enhanced MRI.

METHOD AND MATERIALS

We retrospectively evaluated 570 nodules (440 HCCs, 25 other malignancies, 105 benign nodules) of 3.0 cm or smaller from 418 patients at risk for HCC who underwent gadoxetate disodium-enhanced MRI from July 2015 to December 2016. Final diagnosis was assessed histopathologically or clinically (marginal recurrence after treatment or change in lesion size on follow-up imaging). We compared the sensitivity and specificity for diagnosing HCC among the latest versions of four imaging criteria, including Liver Imaging Reporting and Data System (LI-RADS), European Association for the Study of the Liver (EASL), Asian Pacific Association for the Study of the Liver (APASL), and Korean Liver Cancer Association-National Cancer Center (KLCA-NCC), using the generalized estimating equations.

RESULTS

For >=10 mm nodules, APASL showed the highest sensitivity (85.0%), significantly higher than LI-RADS category 4 or 5 (75.9%), LI-RADS category 5 (64.2%), and EASL (63.4%) ($P <= .001$). Regarding the specificity, LI-RADS category 5 was highest (94.7%), significantly higher than KLCA-NCC (83.0%) and APASL (78.7%) ($P < .001$). For <10 mm nodules, the sensitivity and specificity of LI-RADS category 4 or 5 were 17.1% and 97.2%, respectively, and those of APASL were 73.2% and 83.3%, respectively ($P < .001$ for sensitivity, and $P = .1$ for specificity). For histopathologically confirmed lesions, the results of subgroup analysis were similar to

those of all lesions.

CONCLUSION

Of the four international imaging criteria, APASL had the highest sensitivity and LI-RADS category 5 showed the highest specificity for diagnosing early-stage HCC in high-risk patients on gadoxetate disodium-enhanced MRI.

CLINICAL RELEVANCE/APPLICATION

To improve diagnostic performance of gadoxetate disodium-enhanced MRI for early-stage HCC, it is important to understand the differences of various imaging criteria for HCC.

SSC05-09 Hepatobiliary Phase Hypointensity as Predictor of Progression to Hepatocellular Carcinoma for Intermediate-High Risk Lesions

Monday, Dec. 2 11:50AM - 12:00PM Room: N228

Participants
Federica Vernuccio, MD, Palermo, Italy (*Presenter*) Nothing to Disclose
Roberto Cannella, MD, Palermo, Italy (*Abstract Co-Author*) Nothing to Disclose
Mathias Meyer, Mannheim, Germany (*Abstract Co-Author*) Researcher, Siemens AG; Researcher, Bracco Group
Kingshuk Choudhury, PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Alessandro Furlan, MD, Pittsburgh, PA (*Abstract Co-Author*) Book contract, Reed Elsevier; Royalties, Reed Elsevier
Daniele Marin, MD, Durham, NC (*Abstract Co-Author*) Research support, General Electric Company

For information about this presentation, contact:

federicavernuccio@gmail.com

PURPOSE

To determine the prognostic performance of hepatobiliary phase hypointensity, and Liver Imaging Reporting and Data System (LI-RADS) major imaging features in the prediction of progression to hepatocellular carcinoma (HCC) in LR-3 and LR-4 hepatic lesions with arterial phase hyperenhancement (APHE) measuring >= 10 mm in patients at high risk of HCC.

METHOD AND MATERIALS

This retrospective dual-institution study included 160 LR-3 and 26 LR-4 lesions measuring more than 10 mm and having APHE in 136 consecutive patients (mean age(SD), 57 (11) years old; mean lesion size (SD), 14 (4) mm). A composite reference standard of pathologic analysis and imaging follow-up was used. The prognostic performance (sensitivity and specificity) of hepatobiliary phase hypointensity and LI-RADS version 2018 major imaging features other than APHE for the prediction of probability of progression to HCC and time to progression to HCC was assessed and compared by means of Log-rank test, Cox-regression and Kaplan-Meier curves.

RESULTS

Hepatobiliary phase hypointensity was a predictor of progression to HCC at univariate ($p<0.0001$) and multivariate ($p<0.0001$) analysis, with an odds ratio of 20.6. Median time to progression to HCC was 284 days [95%CI: 266-363). In LR-3 and LR-4 lesions >= 10 mm with APHE that progressed to HCC, the presence of hepatobiliary phase hypointensity, nonperipheral washout or enhancing capsule did not predict time to progression to HCC.

CONCLUSION

Hepatobiliary phase hypointensity is an independent predictor of progression to HCC in intermediate-high risk lesions measuring >= 10 mm and having APHE in patients at risk for HCC.

CLINICAL RELEVANCE/APPLICATION

Intermediate and high risk lesions not fulfilling definitive imaging criteria for HCC account for about 40% of observations during interpretation of CT and MR imaging studies. Natural history of these lesions may be extremely variable. The prognostic information provided by hepatobiliary phase hypointensity in terms of prediction of progression to HCC allows for more tailored management.

SSC06

Gastrointestinal (Advanced Response Evaluation)

Monday, Dec. 2 10:30AM - 12:00PM Room: N230B

BQ GI OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Daniele Marin, MD, Durham, NC (*Moderator*) Research support, General Electric Company
Priya R. Bhosale, MD, Bellaire, TX (*Moderator*) Nothing to Disclose
Nelly Tan, MD, Phoenix, AZ (*Moderator*) Nothing to Disclose

Sub-Events

SSC06-01 Immunotherapy Response Evaluation with Magnetic Resonance Elastography (MRE) in Advanced HCC

Monday, Dec. 2 10:30AM - 10:40AM Room: N230B

Participants
Aliya Qayyum, MD,MBBS, Houston, TX (*Presenter*) Nothing to Disclose
Rony Avritscher, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ajaykumar C. Morani, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Rizwan Aslam, MBBCh, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Jia Sun, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Roberto Carmagnani, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ken-Pin Hwang, PHD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Manal Hassan, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Asif Rashid, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Jingfei Ma, PhD, Houston, TX (*Abstract Co-Author*) Royalties, Siemens AG; Royalties, General Electric Company; Consultant, C4 Imaging
Richard L. Ehman, MD, Rochester, MN (*Abstract Co-Author*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc;
Ahmed Kaseb, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

AQayyum@mdanderson.org

PURPOSE

To determine whether stiffness change on magnetic resonance elastography (MRE) can detect immunotherapy response in advanced HCC.

METHOD AND MATERIALS

This was a prospective study of 15 patients with advanced HCC who were treated with anti-PD-1 therapy, (Pembrolizumab). All patients had a standard of care liver MRI with MRE, and liver biopsy at baseline and after 6 weeks of therapy. HCC stiffness was measured on MRE elastograms. Increase in HCC stiffness was compared with a decrease in HCC ADC, size and enhancement on MRI. Change in HCC stiffness was compared with the time to disease progression, overall survival, and the total number of intratumoral T lymphocytes (CD3+ positive by immunohistochemistry) on targeted liver biopsy. Analysis was performed using descriptive statistics and Spearman correlation (R); p-value <0.05 was considered statistically significant.

RESULTS

Nine evaluable patients (6 men; 3 women) were analyzed. Median age was 71 years (range, 54-78). Etiology of liver disease was HCV (n=4), HBV (n=1) and NASH (n=4). HCC was well-differentiated in 2 of 9 patients, moderately differentiated in 6 and poorly differentiated in 1. Average HCC size was 4 cm (range, 1.5 - 8.5), and change in size at 6 weeks was -0.32 (range, - 2.2 - 0.4). Median time to progression (TTP) was 13 weeks (range, 9-48) and overall survival (OS) was 44 weeks (range, 16-70). Average baseline HCC stiffness and change in HCC stiffness were 5.0 kPa (range, 2.4 -9.1) and 0.12 kPa (range, [-2.1] - 2.8), respectively. Increase in HCC stiffness on MRE correlated significantly with a decrease in ADC (p=0), but there was no correlation with change in HCC size (p=0.5) or enhancement (p=1). HCC stiffness correlated significantly with intratumoral T lymphocytes on biopsy (R = 0.79, p = 0.007). Change in HCC stiffness at 6 weeks correlated significantly with TTP (R = 0.88 and OS (R = 0.81), p <0.01. Baseline non-tumor liver stiffness and HCC size tended toward inverse correlation with overall survival (p < 0.055).

CONCLUSION

Increased HCC stiffness on MRE was associated with longer time to disease progression and survival in advanced HCC and may be useful as a biomarker of early immunotherapy response.

CLINICAL RELEVANCE/APPLICATION

Development of noninvasive functional MRI biomarkers of early immunotherapy response would improve therapeutic management in advanced hepatocellular carcinoma.

SSC06-02 Role of Tumor Morphology and ADC Change in Defining the Need for Additional TACE after Initial

Treatment in Patients with Unresectable HCC

Monday, Dec. 2 10:40AM - 10:50AM Room: N230B

Participants
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Sanaz Ameli, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Roya Rezvani Habibabadi, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

mshagha1@jhmi.edu

PURPOSE

To evaluate the survival benefit of sequential transarterial chemoembolization in different subgroups of patients with unresected hepatocellular carcinoma

METHOD AND MATERIALS

For this IRB approved, HIPPA compliant retrospective cohort study, our institutional database was searched for patients with hepatocellular carcinoma diagnosed during 2005-2016. Patients who had MR imaging, received transarterial chemoembolization (TACE), and did not undergo liver resection or transplantation were included. Data on baseline liver function, number of TACE, and survival status was retrieved from our clinical database. Lesions were categorized to well-defined or ill-defined for subgroup analysis. Baseline tumor volume and volumetric apparent diffusion coefficient (ADC) of tumors at baseline and after first TACE were measured. After adjustment for demographics, baseline liver function, and tumor volume, the correlation between number of TACE and OS was tested using multiple Cox regression in different subgroups of patients.

RESULTS

A total of 159 patients met the inclusion criteria. 52 patients had well-defined and 107 patients had ill-defined HCC tumors. The median number of TACE sessions was comparable between groups (p=0.35). Tumor volume was larger in patients with ill-defined lesions, as compared to well-defined lesions (p=0.001). The median OS was 340 days for all patients, 663 days for those with well-defined lesions, and 257 days for those with ill-defined lesions (HR=1.64, p<0.001). After adjusting for confounders including the tumor size, Cox model showed that patients with ill-defined lesions take survival benefit from an increase in number of TACE sessions (HR=0.86, p=0.020). Higher number of TACE did not improve OS in patients with well-defined lesions (HR=0.91, p=0.173). In patients with well-defined tumors, a cutoff value of >=25% increase in ADC after first TACE was shown to predict better OS (p= 0.023). When categorizing these patients based on this cutoff value, a higher number of TACE did not show any survival benefit (HR=1.12, p=0.422) in patients with >=25% ADC increase (responders). In patients with <25% ADC increase (non-responder to first TACE), an increase in the number of subsequent TACE sessions was shown to significantly improve patients' OS (HR=0.73, p=0.031).

CONCLUSION

Survival benefit of sequential TACE is different for ill- vs well-defined HCC. This benefit is limited in lesions that respond well to first treatment by >=25% increase in ADC. Patients with ill-defined or non-responding well-defined lesions would benefit from additional TACE.

CLINICAL RELEVANCE/APPLICATION

Patients with ill-defined HCC or well-defined lesions with <25% ADC-increase after first TACE will benefit from additional TACE. This benefit is limited in those with adequate response to first TACE.

SSC06-03 Early Survival Prediction Using 3D Quantitative Tumor Response Analysis on MRI in Patients with Advanced Stage Hepatocellular Carcinoma Undergoing Systemic Therapy with Sorafenib

Monday, Dec. 2 10:50AM - 11:00AM Room: N230B

Participants
Luzie A. Doemel, New Haven, CT (*Presenter*) Nothing to Disclose
Julius Chapiro, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Guerbet SA; Consultant, Guerbet SA; Research Grant, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Research Grant, Boston Scientific Corporation;
Fabian Laage-Gaupp, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Lynn J. Savic, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ahmet S. Kuecuekkaya, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Alexandra Petukhova, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Bing Liu, MD,PhD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Jonathan Tefera, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ming de Lin, PhD, North Haven , CT (*Abstract Co-Author*) Employee, Visage Imaging, Inc; Former Employee, Koninklijke Philips NV
Todd Schlachter, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Guerbet SA
Mario Strazzabosco, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Timil Patel, Winston Salem, NC (*Abstract Co-Author*) Nothing to Disclose
Stacey M. Stein, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

julius.chapiro@yale.edu

PURPOSE

To compare uni- (1D) and three-dimensional (3D) quantitative tumor response criteria on multi-parametric magnetic resonance imaging (mpMRI) in patients with hepatocellular carcinoma (HCC) that underwent systemic therapy with sorafenib and to evaluate their ability to predict overall survival (OS) outcomes.

METHOD AND MATERIALS

This IRB-approved retrospective, single-institution analysis included twenty-three patients with advanced stage HCC who received sorafenib for at least 60 days. All patients underwent baseline (BL) and Follow-Up (FU) MRI 19-140 days after initiation of therapy (median 65 days, standard deviation ±33.58). Response to sorafenib was assessed in 37 target lesions using 1D criteria such as Response Evaluation Criteria in Solid Tumors (RECIST) and modified RECIST (mRECIST). In addition, a segmentation-based 3D quantification of enhancing lesion volume (volumetric quantitative European Association for the Study of the Liver, vqEASL) was performed on arterial-phase MRI, and the enhancement fraction of total tumor volume (percentage-based qEASL, pqEASL) was calculated. Accordingly, patients were stratified into groups of Disease Control (DC, which included Complete Response, Partial Response, and Stable Disease) and Disease Progression (DP, included Progressive Disease). Overall survival was evaluated using Kaplan-Meier curves with log-rank test.

RESULTS

The survival analysis showed that stratification of patients in DC vs. DP according to vqEASL was successfully predicted (DC n=22, DP n=15) and stratified overall survival (median OS of 15.4 months for DC, 10.7 months for DP; p=0.01, see Figure 1). Stratification according to RECIST (DC n=20, DP n=17), mRECIST (DC n=27, DP n=10) and pqEASL (DC n=36, DP n=1) did not correlate with OS (p=0.2416, p=0.6945 and p=0.8055, respectively).

CONCLUSION

The study identified vqEASL as an accurate predictor of overall survival early after initiation of sorafenib treatment. This data provides early evidence for potential advantages of 3D quantitative tumor response analysis over conventional techniques regarding early identification of response to or failure of sorafenib.

CLINICAL RELEVANCE/APPLICATION

The use of 3D quantitative vqEASL may optimize clinical decision making and provide more personalized therapeutic algorithms in patients undergoing systemic therapy of advanced stage HCC.

SSC06-04 Multi-Parametric DECT Assessment of Therapeutic Response to Neo-Adjuvant Chemoradiation in Pancreatic Cancer Patients to Determine Surgical Resectability

Monday, Dec. 2 11:00AM - 11:10AM Room: N230B

Participants
Avinash R. Kambadakone, MD, Boston, MA (*Presenter*) Research Grant, General Electric Company; Research Grant, Koninklijke Philips NV
Vinit Baliyan, MBBS, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Hamed Kordbacheh, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Theodore S. Hong, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Carlos Fernandez-Del Castillo, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Dushyant Sahani, MD, Boston, MA (*Abstract Co-Author*) Research support, General Electric Company Medical Advisory Board, Allena Pharmaceuticals, Inc

For information about this presentation, contact:

AKAMBADAKONE@mgh.harvard.edu

PURPOSE

To study if iodine quantification and CTTA can detect histologic response in pancreatic cancer following neoadjuvant chemoradiation

METHOD AND MATERIALS

This IRB approved study prospectively included patients with borderline resectable or locally advanced pancreatic ductal adenocarcinoma (PDAC) undergoing neo-adjuvant chemoradiation (NACT/RT) prior to surgical resection. Patients underwent multiphase abdominal dual energy (DECT) at baseline and a presurgical DECT within 2 weeks of completion of NACT/RT. Based on post-surgical pathology the patients were divided into good histologic response and poor histologic response. The tumor morphology (RECIST 1.1), Iodine quantification and CT texture analysis (CTTA) were compared between these two groups using student t-test and Mann Whitney U test. Multiple regression was used to identify the strongest independent predictor of histological response.

RESULTS

Final patient cohort included 25 patients of which 13 had good histologic response and 12 had poor histologic response. Morphological response by RECIST 1.1 was associated with good histologic response (5/13 vs 0/12 respectively, p=0.039). CTTA parameters were significantly different between the good and poor histologic response groups at baseline, but more frequently after NACT/RT (Figure). On multivariate analysis, CTTA was a strong (rpartial=0.68; p=0.007) and independent predictor of histological response after NACT/RT. There was no significant difference in the quantitative iodine values at baseline, early treatment and after completion of chemoradiation both in the arterial/pancreatic phase and portal venous phase.

CONCLUSION

CT texture analysis performed on post processed DECT images is a strong marker for assessing and predicting histologic response after neoadjuvant chemoradiation in pancreatic and outperforms morphologic features of tumor size and vascular involvement.

CLINICAL RELEVANCE/APPLICATION

The detection of post NACT/RT treatment effects in PDAC is very challenging and can not be reliably assessed on conventional imaging. This study shows that CTTA can reliably predict and assess the histologic response.

SSC06-05 Yttrium-90 Radioembolization for Hepatocellular Carcinoma: Outcome Prediction with MRI Derived Fat-Free Muscle Area

Monday, Dec. 2 11:10AM - 11:20AM Room: N230B

Participants
Anton Faron, MD, Bonn, Germany (*Presenter*) Nothing to Disclose
Martin A. Sprinkart, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Sebastian Nowak, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Claus C. Pieper, MD, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Rolf Fimmers, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Daniel Kuetting, MD, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Wolfgang Block, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Carsten Meyer, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Daniel K. Thomas, MD, PhD, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose
Julian A. Luetkens, MD, Bonn, Germany (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Anton.Faron@ukbonn.de

PURPOSE

Sarcopenia is associated with adverse outcomes in gastrointestinal malignancies and liver cirrhosis. We aimed at investigating the utility of magnetic resonance imaging (MRI) derived fat-free muscle area (FFMA) to predict clinical outcome in patients receiving yttrium-90 radioembolization (RE) for treatment of hepatocellular carcinoma (HCC).

METHOD AND MATERIALS

Consecutive patients with unresectable HCC and pre-interventional liver MRI undergoing salvage RE between December 2007 and October 2014 were retrospectively evaluated. Using axial T2-weighted turbo spin echo sequences, FFMA was calculated by subtraction of the intramuscular adipose tissue area from the total cross-sectional area of paraspinal skeletal muscles at the superior mesenteric artery level. FFMA values lower than 3582 mm2 in male and 2301 mm2 in female patients were defined as low FFMA. Main outcomes were progression-free survival (PFS) and overall survival (OS). For outcome analysis, the Kaplan-Meier method with log rank test and multivariate cox regression analysis were used.

RESULTS

Fifty-eight patients (13 female, mean age 68+-12 years) were included. Mean time from pre-interventional MRI to RE was 27 ± 20 days. Median OS and PFS after RE were 250 (range: 21-1230 days) and 156 days (range: 21-674 days), respectively. Patients with low FFMA showed significantly reduced OS (197 vs. 294 days, P=0.024) and tended to have shortened PFS (109 vs. 185 days, P=0.068). Low FFMA (HR 2.675; P=0.011), estimated liver tumor burden (HR 4.058; P=0.001), and Eastern Cooperative Oncology Group (ECOG) performance status (1.763; P=0.009) were independent predictors of OS on multivariate analysis.

CONCLUSION

FFMA might represent a promising new biomarker for survival prognosis in patients undergoing RE for treatment of unresectable HCC.

CLINICAL RELEVANCE/APPLICATION

In this study, we offer an easy applicable MRI-based measurement of lean muscle mass as a measure of sarcopenia which is capable to predict outcome in patients receiving RE for treatment of unresectable HCC.

SSC06-06 Early Tumor Viability Prediction Following Y90 Radioembolization Segmentectomy for Hepatocellular Carcinoma Using Automated 3D Tumor Sub-Volume Segmentation and Texture Analysis

Monday, Dec. 2 11:20AM - 11:30AM Room: N230B

Participants
Brett Marinelli, MD,MS, New York, NY (*Presenter*) Speaker, Siemens AG; Research Consultant, Cibiem Inc
Daniel Stocker, MD, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Dudley Charles, New York , NY (*Abstract Co-Author*) Nothing to Disclose
Sara D. Pasik, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Young Joon Kwon, BS, MS, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Rahul S. Patel, MD, New York, NY (*Abstract Co-Author*) Consultant, Sirtex Medical Ltd Research Consultant, Medtronic plc Consultant, Penumbra, Inc Consultant, Terumo Corporation
Aaron M. Fischman, MD, New York, NY (*Abstract Co-Author*) Advisory Board, Terumo Corporation Consultant, Terumo Corporation Advisory Board, Embolx, Inc Consultant, Embolx, Inc Speakers Bureau, Boston Scientfic Corporation Speakers Bureau, BTG International Ltd Royalties, Merit Medical Systems, Inc Investor, Adient Medical Inc
Vivian L. Bishay, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Mona B. Ranade, MD, Brookfield, WI (*Abstract Co-Author*) Nothing to Disclose
Scott Nowakowski, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Robert A. Lookstein, MD, New York, NY (*Abstract Co-Author*) Consultant, Boston Scientific Corporation Consultant, Medtronic plc
Bachir Taouli, MD, New York, NY (*Abstract Co-Author*) Research Grant, Bayer AG; Research Grant, Takeda Pharmaceutical Company Limited; Research Grant, Regeneron Pharmaceuticals, Inc; Consultant, Alexion Pharmaceuticals, Inc; Consultant, Bayer AG; ;
Edward Kim, MD, New York, NY (*Abstract Co-Author*) Consultant, Koninklijke Philips NV Advisory Board, Onyx Pharmaceuticals, Inc Advisory Board, Sterigenics International LLC

For information about this presentation, contact:

brett.marinelli@mountsinai.org

PURPOSE

Tumor viability (TV) after radioembolization segmentectomy (RS) is often not definitive on follow-up MRI until several months later.

Given an array of available treatment options for early and advanced HCC, sooner determination of RS efficacy is needed to facilitate optimal disease management.

METHOD AND MATERIALS

83 patients with initial RS 1/1/14 - 12/31/17 were retrospectively reviewed. Patients with prior TACE, TARE, systemic therapy or target lesion (TL) retreatment after first follow-up (FU1) and before second follow-up (FU2) were excluded. All FU MRIs were assessed using mRECIST criteria. Tumor viability (TV) was defined as PR, SD or PD. Using Slicer's GrowCut tool duplicate tumor and normal parenchymal segmentations were made on T1 arterial phase (T1 AP) and ADC on pre-RS and FU1 MRI. Automated calculation of 3D hypo- and hyperintense sub-volumes and first order texture features were performed using SimpleITK, Numpy and PyRadiomics. Segmentation time and intraclass correlation (ICC) of segmentations was assessed. Metrics were compared to TV at FU2 and time to TL TV. Univariate Mantel-Cox time to event, logistic regression and ROC analysis were performed using R and Prism.

RESULTS

47 patients were selected with a mean age of 70 (66% male). 5, 27, 10 and 5 were BCLC 0, A, B, and C. Mean TL size (mm) and dose (mCi) were 26 (SD19) and 49 (SD27), respectively. Pre-RS MRI was performed a mean 44 (SD 13) days before treatment. FU1 and FU2 MRIs were performed a mean 51 (SD 15) and 136 (SD 38) days after intervention. 373 tumor segmentations were made taking a mean 3.4 (SD 2.1) minutes each with ICC of 0.83 (95CI 0.78-0.88). At FU2 36 and 11 had CR and tumor viability, respectively. Median overall survival was 30 months. On logistic regression analysis, difference in T1 AP and ADC kurtosis between pre-RS and FU1 were significantly predictive of TV on FU2 with AUC 0.77 ($p<0.05$) and 0.76 ($p<0.05$). There were no significant differences on median-split, univariate time to TV for all measures.

CONCLUSION

On early follow-up MRI after RS hyper- and hypointense sub-volume sizes do not appear correlated with TV, however, 3D tumor texture analysis do appear to be predictive of TV.

CLINICAL RELEVANCE/APPLICATION

Texture analysis may provide insight into tumor viability earlier than mRECIST. If validated prospectively, adoption of routine tumor segmentation and MR-based quantitative analyses may hasten and improve HCC treatment decision making.

SSC06-07 Dual-Energy CT Vital Iodine Tumor Burden as a Quantitative Response Parameter in Patients with GIST Undergoing Tyrosine-Kinase-Inhibitor Therapy - A Comparison to Standard CT and FDG-PET Criteria

Monday, Dec. 2 11:30AM - 11:40AM Room: N230B

Participants
Mathias Meyer, Mannheim, Germany (*Presenter*) Researcher, Siemens AG; Researcher, Bracco Group
Daniel Overhoff, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Anna Bartsch, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Holger Haubenreisser, Stuttgart, Germany (*Abstract Co-Author*) Speaker, Siemens AG Speaker, Bayer AG Speaker, Bracco Group
Peter Hohenberger, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Hideki Ota, MD,PhD, Sendai, Japan (*Abstract Co-Author*) Grant, Canon Medical Systems Corporation
Christina Messiou, MD, BMBS, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Thomas Henzler, MD, Mannheim, Germany (*Abstract Co-Author*) Nothing to Disclose
Stefan O. Schoenberg, MD, PhD, Mannheim , Germany (*Abstract Co-Author*) Nothing to Disclose
Daniele Marin, MD, Durham, NC (*Abstract Co-Author*) Research support, General Electric Company

PURPOSE

o determine whether dual-energy CT (DECT) vital iodine tumor burden (VITB) allows reliable response assessment in patients with a Gastrointestinal Stromal Tumor (GIST) undergoing Tyrosine-Kinase Inhibitor therapy (TKI), compared to established CT and [18F] fluorodeoxyglucose (FDG) positron emission tomography (PET) criteria.

METHOD AND MATERIALS

An anthropomorphic phantom equipped with spherical GIST lesions of 3 different iodine concentrations (1, 2 and 5mg/mL) and a non-enhancing central necrotic core (40HU at 120kVp) was scanned on a second generation dual-source DECT platform. 40 patients with 155 metastatic GIST lesions underwent a portal phase DECT on the same platform. Each patient had a pre-treatment and a 3-4-months follow-up DECT and FDG-PET after TKI-treatment. Up to 5 target lesions were selected using mRECIST 1.1 guidelines. Tumor burden was assessed using different tumor response criteria, including mRECIST 1.1, mChoi, VTB, and VITB. Standardized uptake value (SUVmax) on the FDG-PET datasets, which is the current reference standard for metabolic response assessment in patients with GIST. Progression-free survival (PFS) in responders (complete, partial response and stable disease) and non-responders (progressive disease) according to each response criteria was compared by using the Cox proportional hazard ratio (HR).

RESULTS

The anthropomorphic phantom revealed a cut-off of 0.5mg/mL (15HU on the iodine image) to differentiate necrotic from vital tumor tissue. The median PFS was significantly different between non-responders and responders and comparable among the SUVmax criteria (632days; HR=4.6; 95%CI:2.2-10.1; $p<.001$), the VITB criteria (521days; HR=28.4; 95%CI:7.8-184.9; $p<0.001$) and VTB criteria (501days; HR=8.1; 95%CI:3.4-21.2; $p<.001$). VITB allowed a significant better differentiation between non-responders and responders compared to mRECIST 1.1 (414days; HR=2.5; 95%CI:1.3-5.0; $p<.010$). and mChoi criteria (151days; HR=1.1; 95%CI:0.5-2.1; $p<.001$).

CONCLUSION

The VITB criteria showed comparable performance to FDG-PET criteria for response assessment of patient with GIST under TKIs while outperforming mRECIST 1.1 and mChoi criteria.

CLINICAL RELEVANCE/APPLICATION

VITB is a quantitative DECT imaging biomarker that captures the effects of TKI therapy and predicts tumor response (PFS) in

patients with GIST and could be used to guide treatment management.

SSC06-08 Dynamic Control of Chelation Therapy in Transfusion Dependent and Non-Transfusion Dependent Patients Using Hepatic MRI and DECT

Monday, Dec. 2 11:40AM - 11:50AM Room: N230B

Participants
Anna M. Titova, Saint Petersburg, Russia (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

anisa33@mail.ru

PURPOSE

To show the possibilities of DECT as well as MRI in the diagnostic of iron overload (IOL) and monitoring of chelation therapy. To determine sufficient time intervals between dynamic hepatic DECT and MRI in controlling of chelation therapy results in Transfusion Dependent (TD) and Non-Transfusion Dependent (NTD) patients with IOL.

METHOD AND MATERIALS

We examined 75 patients with suspected IOL. 14 of them were NTD, the other 61 - TD. We conducted T2* MRI study of the liver by 1.5T scanner for assessment of liver iron concentration (LIC) and performed DECT procedures with 80kV and 140kV on the limited area of the liver of the same patients with the slice thickness of 5mm and calculation of Dual Energy indicators. Chelation therapy was prescribed for all examined patients in doses depending on body weight. 6 and 12 months later, we repeated the same procedures to the earlier examined patients who received iron chelators. For various reasons, only 26 of them were able to undergo CT and MRI studies at appointed times.

RESULTS

We calculated IOL severity for the examined patients. Using correlation and regression analysis, it was found that the calculation of the dual-energy difference (HU) gives high correlation coefficient (r=0.93) with IOL severity, it means that the predicted values of IOL by CT fall into all ranges of IOL according to MRI. Using the data of 26 patients after 6 and 12 months chelation, in all DECT-results we also established the conformity of our findings to the MRI data. In both control CT and MRI study of NTD patients with HH (n=9), degree of LIC decrease significant - average 12% in 6 months, and 33% in a year. When analyzing similar control MRI data in TD patients (n=17), we had extremely slow dynamics of reducing the LIC (average 2,75% in 6 months, 7% in a year). MRI data show that there is some dynamic, while DECT data demonstrate no significant dynamic either in 6 or in 12 months of treatment (less than 1% decreasing).

CONCLUSION

DECT, like MRI, is a useful technique for controlling chelation therapy. However, such studies in NTD patients should be more frequent to avoid hyper-chelation. The use of DECT for the annual control of chelation therapy in TD patients is not justified.

CLINICAL RELEVANCE/APPLICATION

Recommended to undergo hepatic MRI or DECT for NTD patients no less than every 6 months to control chelation therapy results, especially with light or moderate IOL severity, to avoid over-chelation.

SSC06-09 Post-TACE Changes in the Mean Value and Kurtosis of Apparent Diffusion Coefficient Histograms are Independent Predictors of Overall Survival in Patients with Hepatocellular Carcinoma

Monday, Dec. 2 11:50AM - 12:00PM Room: N230B

Participants
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Sanaz Ameli, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Roya Rezvani Habibabadi, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

mshagha1@jhmi.edu

PURPOSE

To identify MR imaging parameters that can be used for evaluating early tumor response and overall survival (OS) after transarterial chemoembolization in patients with hepatocellular carcinoma

METHOD AND MATERIALS

In this IRB approved, HIPAA compliant retrospective cohort study, our institutional database was searched for patients with confirmed HCC, diagnosed during 2005-2016. Imaging data were reviewed by a radiologist and patients with well-defined tumors were recruited initially (n=151). Patients with available apparent diffusion coefficient (ADC) map at baseline and 3-4 weeks after first TACE were included (n=99). Demographic data, HCC etiology, baseline Child score, treatment modalities, and survival status were retrieved from clinical database. Volumetric MRI metrics including tumor volume, mean ADC, skewness and kurtosis of ADC were measured at baseline and 1 month post-TACE. Change in variables was calculated by subtracting baseline values from post-TACE measures. Univariate and multiple Cox models were used to test the independent role of change in imaging parameters to predict OS. $p<0.05$ was considered significant.

RESULTS

In unadjusted survival model, baseline tumor volume, changes in ADC and ADC-kurtosis were potential imaging predictors of survival. After adjusting for baseline liver function, tumor volume, number of TACE sessions, and treatment modality, incremental percent change in ADC was an independent predictor of better OS (HR=0.98, p=0.020). In overall, a decremental change in ADC-kurtosis (increase in heterogeneity) showed a strong trend in predicting better prognosis (HR=0.92, p=0.051). Categorizing patients to responders (>=25% ADC increase) and non-responders (<25% ADC increase) based on change in mean ADC provided a good prediction of OS (c-index: 0.791). Responders had the best survival profile (HR=0.42, p=0.021). Subgroup analysis showed that in non-responders, change in ADC-kurtosis (Δ kADC) as an indicator of change in tissue homogeneity, could distinguish between poor and fair prognosis (cutoff=0.5). It was not a measure of difference among responders (p=0.86). Non-responder patients with Δ kADC >=0.5 (homogeneous post-TACE tumor) had the worst prognosis (HR=3.03, p=0.007), as compared to responders and those of non-responders who had Δ kADC <0.5 (log-rank p=0203).

CONCLUSION

A >=25% increase in ADC demonstrated favorable response to TACE in patients with HCC. In non-responder patients, an increase in tumor heterogeneity, as measured by ADC-kurtosis, could distinguish patients with relatively better prognosis from those with the worst survival profile.

CLINICAL RELEVANCE/APPLICATION

Change in mean ADC and ADC-kurtosis, as a measure of change in tissue heterogeneity, can be used to monitor early response to TACE in well-defined HCC and to identify patients with treatment failure and poor prognosis

Printed on: 10/29/20

GIS-MOA

Gastrointestinal Monday Poster Discussions

Monday, Dec. 2 12:15PM - 12:45PM Room: GI Community, Learning Center

GI

AMA PRA Category 1 Credit ™: .50

Participants

Jennifer W. Uyeda, MD, Boston, MA (*Moderator*) Consultant, Allena Pharmaceuticals, Inc

Sub-Events

GI344-SD-MOA1 Predicting Early Tumor Recurrence Prior to Surgery Compared with After Surgery for Patients with Single HCC

Station #1

Participants

Dong Ik Cha, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Kyung Mi Jang, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seong Hyun Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Honsoul Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

We evaluated whether predicting early tumor recurrence using preoperative laboratory and imaging factors is non-inferior than using preoperative and postoperative pathologic factors in patients with single hepatocellular carcinoma within the Milan criteria.

METHOD AND MATERIALS

549 patients with single HCC within the Milan criteria who underwent curative resection were included. Two prediction models for early recurrence of HCC were developed using selected preoperative factors only and using both preoperative and postoperative factors which were determined by stepwise variable selection methods based on Akaike information criterion (AIC). Area under the curve (AUC) for each receiver operating characteristic (ROC) curve of the two models was calculated, and the two curves were compared for non-inferiority testing. The predictive models of early HCC recurrence were internally validated by bootstrap resampling method.

RESULTS

Multivariable analysis of preoperative factors showed that AST/platelet ratio index (APRI), tumor size, arterial rim enhancement of the tumor, peritumoral parenchymal enhancement, and presence of nonhypervascular hepatobiliary hypointense nodules (NHHN) on gadoxetic acid-enhanced magnetic resonance imaging (MRI) were significant factors. On multivariable analysis after adding patholgoic factors, presence of microvascular invasion was added instead of tumor size. Comparison of the AUCs of the two models showed that prediction model using selected preoperative factors only was non-inferior to that using both preoperative and postoperative factors [preoperative factors only; 0.673 (95% CI: 0.623¬0.723) vs. after adding postoperative factors; 0.691 (95% CI: 0.639-0.744); p = 0.0013]. Bootstrap resampling method showed that the two models were valid.

CONCLUSION

The performance of using preoperative laboratory and imaging factors was not inferior to that using preoperative and postoperative pathologic factors for prediction of early recurrence after curative resection of single HCC within the Milan criteria.

CLINICAL RELEVANCE/APPLICATION

Since predicting early recurrnece using preoperative laboratory and imaging factors was non-inferior to that using preoperative and postoperative pathologic factors, more individualized patient care before and after surgery could be given to patients with expected early recurrence.

GI338-SD-MOA2 The Role of Sarcopenia in Patients with Intrahepatic Cholangiocarcinoma Undergoing TACE and SIRT

Station #2

Participants

Felix Hahn, MD,MSc, Mainz, Germany (*Presenter*) Nothing to Disclose
Lukas Mueller, Mainz, Germany (*Abstract Co-Author*) Nothing to Disclose
Roman Kloeckner, MD, Mainz, Germany (*Abstract Co-Author*) Advisory Board, Guerbet SA; Advisory Board, Bristol-Myers Squibb Company; Advisory Board, Sirtex Medical Ltd; Speaker, Guerbet SA; Speaker, Sirtex Medical Ltd; Speaker, BTG International Ltd
Sebastian Schotten, MD, Mainz, Germany (*Abstract Co-Author*) Nothing to Disclose
Christoph Dueber, MD, Mainz, Germany (*Abstract Co-Author*) Nothing to Disclose
Arndt Weinmann, Mainz, Germany (*Abstract Co-Author*) Nothing to Disclose
Aline Maehringer-Kunz, MD, Mainz, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Sarcopenia has been proposed as a prognostic parameter for patients with intrahepatic cholangiocarcinoma (ICC). The aim of this study was to investigate the prognostic value of sarcopenia in patients with ICC undergoing TACE or SIRT.

METHOD AND MATERIALS

Between 1997 and 2018, 417 patients with ICC were referred to our tertiary care center. A total of 45 patients received TACE or SIRT and were included in this study. Psoas muscle index (PMI) served as an easy-to-measure marker of sarcopenia. Using optimal stratification, cut-off values for PMI regarding overall survival (OS) were calculated. As a control group, 198 patients undergoing liver resection were evaluated.

RESULTS

In the group undergoing TACE/SIRT, no predictive cut-off values for PMI could be calculated (best log-rank p=0.15, cut-offs 5.00cm²/m² in men and 3.45cm²/m² in women, median OS 9.4 months vs 15.0 months). In contrast, in the subgroup undergoing liver resection, optimal stratification yielded PMI cut-offs that were predictive for OS (cut-offs 5.74cm²/m² in men and 5.19cm²/m² in women, log-rank p=0.002, median OS 20.4 months vs 30.2 months). Tumor burden was significantly higher in the TACE/SIRT group compared to the resection group: multifocality in 62% vs 22% (p<0.001), mean sum of intrahepatic lesions 14.6cm vs 8.2cm (p<0.001), translobar spread in 50% vs 8% (p<0.001), and increased tumor volume (0%-25%/25%-50%/>50% in 19/16/10 vs 164/32/2, p<0.001).

CONCLUSION

In contrast to patients undergoing liver resection, PMI was not predictive in patients with ICC undergoing TACE/SIRT. Extensive tumor burden and poor survival times are likely to be factors that complicate establishing survival discriminators.

CLINICAL RELEVANCE/APPLICATION

Sarcopenia did not allow for reliable survival stratification following TACE or SIRT; other parameters like ECOG or tumor burden are probably more suitable (co)predictors.

GI339-SD-MOA3 MDCT Features for Diagnosis of Single Adhesive Band versus Matted Adhesions in Small Bowel Obstruction

Station #3

Participants
Pierre Berge, MBBS, Saint Martin du Bois , France (*Presenter*) Nothing to Disclose
Maxime Delestre, Angers, France (*Abstract Co-Author*) Nothing to Disclose
Anita Paisant, Angers, France (*Abstract Co-Author*) Nothing to Disclose
Antoine Hamy, MD, Angers, France (*Abstract Co-Author*) Nothing to Disclose
Christophe Aube, MD, PhD, Angers, France (*Abstract Co-Author*) Nothing to Disclose
Jean-Francois Hamel, Angers, France (*Abstract Co-Author*) Nothing to Disclose
Aurelien Venara, MD , Angers, France (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

pierre.berge@chu-angers.fr

PURPOSE

The objective was to determinate computed tomography (CT) scanner signs to differentiate small bowel obstruction (SBO) induced by single adhesive band (SAB) and matted adhesions (MA) and to elaborate a radiological score predicting of SAB.

METHOD AND MATERIALS

All consecutive patients who undergone surgery from January 2013 to June 2018 for adhesions-induced SBO were retrospectively included. Reference of SBO type (SAB or MA) was given by surgery. All CT scan were secondary read by an observer blinded of clinical and surgical finding. Fisher's exact test, Mann-Whitney U test and a logistic regression model were used. The score was elaborated on 143 patients and validated on 50 patients of the same population.

RESULTS

Among the 193 patients having surgery for SBO, 119 (61.6%) had SAB and 74 (38.4%) had MA surgically proven. In multivariate analysis, the presence of a beak sign (OR=3.47, 95%CI [1.26;9.53], p=0.02), a closed-loop (OR=11.37, 95%CI [1.84;70.39], p=0.009), focal mesenteric haziness (OR=3.71, 95%CI [1.33;10.34], p=0.01) and focal and diffuse peritoneal fluid (respectively OR=4.30, 95%CI [1.45;12.73], p=0.009 and OR=6.34, 95%CI [1.77;22.59], p=0.004) were significantly associated with SAB. Contrariwise, the presence of diffuse mesenteric fluid without focal fluid (OR=0.23, 95%CI [0.06;0.92], p=0.04) and the diameter of the most dilated loop (OR=0.94, 95%CI [0.90;0.99], p=0.02), were inversely associated with SAB. Using the significant predictive factors of SAB, we built a composite score to radiologically predict the etiology of SBO. Area under Receiver Operating Characteristic (ROC) curve was 0. 8274. For a cut-off score = -0.523, sensitivity, specificity and the percentage of patients correctly classified were respectively 78.4%, 84.6% and 80.0%.

CONCLUSION

Several radiologic variables are strongly associated with the diagnosis of SAB-induced SBO. The present score could represent a significant tool in the decision of surgical management

CLINICAL RELEVANCE/APPLICATION

By discriminating single adhesive band and matted adhesions in adhesional small bowel obstruction, MDCT could be a key element in the decision for surgical management.

GI340-SD-MOA4 CT Findings with High Specificity and Sensitivity for Closed Loop Small Bowel Obstruction

Station #4

Participants
Riya Goyal, MD, Mineola, NY (*Presenter*) Nothing to Disclose
Hwayoung K. Lee, MD, Englewood Cliffs, NJ (*Abstract Co-Author*) Nothing to Disclose
Leonora Mui, MD, Manhasset, NY (*Abstract Co-Author*) Nothing to Disclose
Sadjad Riyahi, MD, Sunnyside, NY (*Abstract Co-Author*) Nothing to Disclose
Martin R. Prince, MD,PhD, New York, NY (*Abstract Co-Author*) Patent agreement, General Electric Company; Patent agreement, Hitachi, Ltd; Patent agreement, Siemens AG; 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, Mallinckrodt plc; Patent agreement, Guerbet SA; Patent agreement, Toshiba Corporation

For information about this presentation, contact:

rgoyal1@northwell.edu

PURPOSE

To identify the sensitivity and specificity of computed tomography (CT) findings in patients with suspected closed loop small bowel obstruction (CLSBO).

METHOD AND MATERIALS

The radiology database and surgical reports from two suburban teaching hospitals were reviewed retrospectively for patients diagnosed with CLSBO over a 3 year time period. Eligible for inclusion were consecutive patients ages 13-100 with clinical suspicion of CLSBO based on presenting symptoms who had a CT abdomen/pelvis performed. Patients with a CT report containing key words, 'CLSBO' or 'internal hernia' or surgical report with a diagnosis of CLSBO/internal hernia who had a CT performed prior to surgery were included in the study. Two radiologists evaluated the scans for imaging features associated with CLSBO. The electronic medical records of the study population were independently reviewed for clinical factors and operative findings. Sensitivity and specificity were calculated for the diagnosis of CLSBO and each CT sign using postoperative diagnosis or clinical diagnosis for patients who did not undergo surgery as the reference standard.

RESULTS

Of 224 patients included in the analysis, 222 had surgical confirmation of CLSBO and 2 were diagnosed clinically. Sensitivity and specificity of CT findings included: proximal dilatation (97%, 5%), distal collapse (96%, 2%), mesenteric edema (94%, 5%), beak sign (91%, 17%) ascites (92%, 2%), fecalization (48%, 56%), whirl sign (27%, 88%), target sign (19%, 83%), radial distribution (19%, 78%), bowel wall thickening (19%, 81%), bowel enhancement (15%, 83%), multiple transition points (4%, 88%), pneumatosis (1%, 100%), free air (1%, 98%), and U or C configuration (28%, 59%). Common clinical findings included prior surgery (84%), cancer (29%), and serum lactate >2.2mg/dl (25%).

CONCLUSION

Imaging findings associated with CLSBO have either a high sensitivity (ascites, proximal dilatation, mesenteric edema, beak sign) or high specificity (whirl sign, target sign, radial distribution, multiple transition points). Accurate diagnosis requires systematic assessment for multiple signs.

CLINICAL RELEVANCE/APPLICATION

The accurate diagnosis of life threatening CLSBO requires attention to multiple CT imaging findings shown to have a high specificity and high sensitivity.

GI364-SD-MOA5 Reproducibility of Radiomic Features Across Different Dose Strengths and Reconstructions for Diagnosis of Active Terminal Ileal Crohn's Disease on CT Enterography

Station #5

Participants
Prathyush Chirra, Cleveland, OH (*Presenter*) Nothing to Disclose
Namita S. Gandhi, MD, Chagrin Falls, OH (*Abstract Co-Author*) Nothing to Disclose
Furquan M. Baqui, DO, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Kaustav Bera, MBBS, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Zhouping Wei, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Ziwei Liu, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Satish Viswanath, Cleveland, OH (*Abstract Co-Author*) Scientific Advisory Board, Virbio Inc

For information about this presentation, contact:

gandhin@ccf.org

PURPOSE

Radiomics is an objective method for extracting quantitative information from medical images and CT Enterography (CTE) is commonly used to diagnose terminal ileal (TI) Crohn's disease (CD). The purpose of this study was to identify Radiomics features of active terminal ileal (TI) CD and assess reproducibility of these features across different dose strengths and reconstruction settings.

METHOD AND MATERIALS

IRB approved, retrospective, single center study. Study cohort of 89 patients with active TI CD (44) & normal (45). All patients had a CTE on a dual-source CT (100% dose) with filtered back projection (FBP) reconstruction. Single source (50% dose) data was extracted and reconstructed with filtered back projection (FBP) and iterative reconstruction (IR) using sinogram affirmed iterative reconstruction (SAFIRE), yielding 3 datasets per patient: full-dose FBP (FDFBP),half-dose FBP (HDFBP), half-dose iterative reconstruction (HDIR). Cohort was split into a training set (n=69) and hold-out validation set (n=20). TI was annotated by an expert radiologist on FDFBP set, from which a total of 196 radiomic features were extracted. 5 top-ranked radiomic features for active TI CD were identified via cross-validation on FDFBP training set. These 5 features were used to train a random forest classifier to distinguish patients with active TI CD and normal, in 3 hold-out validation sets corresponding to each of FDFBP, HDFBP, and HDIR images. Statistical evaluation included ROC analysis and testing of feature significance.

RESULTS

Radiomic features showed higher texture heterogeneity within TI regions in patients with active TI CD as comapred to normals (all p values < 0.001).Using top-ranked radiomic features of intensity or gradient co-occurrence, hold-out AUC for FDFBP was high on both full-dose images (FDFBP AUC=0.9) and half-dose images (HDFBP AUC = 0.89, HDIR AUC = 0.91) with all p values <0.001.

CONCLUSION

Radiomic features of TI on CTE can reproducibly and consistently diagnose active CD across different dose strengths and

Radiomic features of TI on CTE can reproducibly and consistently diagnose active CD across different dose strengths and reconstruction settings.

CLINICAL RELEVANCE/APPLICATION

Radiomic features of the terminal ileum exhibit a highly accurate and consistent signature for diagnosis of active TI CD across different doses and reconstructions and can be complementary to a radiologist for diagnosis of active TI CD even in low dose scans.

GI365-SD-MOA6 Value of Diffusion Weighted Imaging and Circulating Tumor Cells on Predicting the Short-Term Efficacy of Chemoradiotherapy in Esophageal Squamous Cell Carcinoma Patients

Station #6

Participants
Zhengyan Jia, Zhengzhou, China (*Presenter*) Nothing to Disclose
Jinrong Qu, Zhengzhou, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

qjryq@126.com

PURPOSE

To investigate diffusion weighted imaging (DWI) and circulating tumor cells (CTCs) in predicting short-term efficacy of chemoradiotherapy in patients with esophageal squamous cell carcinoma (ESCC).

METHOD AND MATERIALS

Fifty-one patients who were confirmed ESCC with pathologically and treated with chemoradiation were collected retrospectively from November 2016 to April 2018. All patients underwent DWI and CTCs examination before treatment. The ADC value was calculated on DWI images. CTCs were separated and divided into three substypes:epithelial CTCs, mesenchymal CTCs, hybrid CTCs. Short-term efficacy evaluation was performed using RECIST 1.1, which was divided into remission group (CR, PR) and non-remission group (SD, PD). The Mann-Whitney U test was used to compare parameters between groups. The predictive ability of ADC value and CTCs and their combination was analyzed by receiver operating characteristic curve (ROC).

RESULTS

Thirty-four patients were in the remission group, and 17 patients in the non-remission group among 51 patients. The maximum, average, and minimum values of the ADC in the remission group were lower than those values in the non-remission group (P=0.045, 0.033, 0.001). The mesenchymal CTCs in the remission group were higher than those in the non-remission goup (P=0.020). However, there was no significant difference between the remission group and the non-remission group in the numbers of epithelial CTCs, hybrid CTCs, and total CTCs (P=0.377, 0.771, 0.734). From ROC analysis, the area under the ROC curve of ADC minimum value, mesenchymal CTCs, and their combination was 0.777, 0.689, and 0.834, respectively. The sensitivity of ADC minimum value, mesenchymal CTCs, and their combination were 70.6%, 70.6%, and 64.7%, respectively. The specificity of ADC minimum value, mesenchymal CTCs, and their combination were 85.3%, 61.8, and 88.2%, respectively.

CONCLUSION

ADC values and mesenchymal CTCs can be used as a method to predict short-term efficacy of chemoradiotherapy in ESCC patients, and the mesenchymal CTCs combined with ADC minimum value provide higher diagnostic value in predicting short-term efficacy of chemoradiotherapy, which can be used as a new method for predicting short-term efficacy of chemoradiotherapy in ESCC patients.

CLINICAL RELEVANCE/APPLICATION

Combination ADC andCTCs can be used as a new method for predicting short-term efficacy of chemoradiotherapy for ESCC patients.

GI366-SD-MOA7 Imaging Predictors of Pancreatic Adenocarcinoma Patient Survival After Resection

Station #7

Participants
Shannan Dickinson, MBBS, BMedSc, New York, NY (*Presenter*) Nothing to Disclose
Caitlin A. McIntyre, New York , NY (*Abstract Co-Author*) Nothing to Disclose
Juliana B. Schilsky, MS, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Kate A. Harrington, BMBCh, MRCPI, Dublin, Ireland (*Abstract Co-Author*) Nothing to Disclose
Scott Gerst, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Jessica Flynn, BS, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Mithat Gonen, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Marinela Capanu, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Winston Wong, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Peter J. Allen, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Eileen O'Reilly, New York, NY (*Abstract Co-Author*) Nothing to Disclose
William Jarnagin, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Amber Simpson, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Richard Kinh Gian Do, MD,PhD, New York, NY (*Abstract Co-Author*) Consultant, Bayer AG; Author, Reed Elsevier; Spouse, Author, Wolters Kluwer nv; Spouse, Data Monitoring Committee, Alk Abello

For information about this presentation, contact:

dickinss@mskcc.org

PURPOSE

To identify predictors of survival for resected pancreas adenocarcinoma (PDAC) patients based on imaging findings on preoperative CT.

METHOD AND MATERIALS

IRB approved retrospective review of consecutive patients who underwent resection for pathologically proven PDAC with preoperative CT (within 60 days of surgery) performed between December 2006-July 2017. Patients with prior surgery or PDAC arising in a mucinous neoplasm were excluded. Two radiologists reviewed the preoperative CT and assessed PDAC imaging findings based on the American Pancreatic Association/Society of Abdominal Radiology PDAC reporting template. Interreader agreements (kappa statistics) were measured for the imaging variables and overall survival (OS) was associated with a consensus read of the imaging variables using Cox proportional hazard regression.

RESULTS

168 patients (mean age 66, 0.85:1 male:female) were enrolled: 126 had upfront surgical resection and 42 received neoadjuvant therapy. Imaging variables associated with decreased OS ($p<0.05$) were tumor arterial contact (HR 2.76, 95%CI 1.50-5.09, Kappa=0.52) and tumor contact specifically with the superior mesenteric artery (HR 1.98, 95%CI 1.08-3.61, Kappa=0.68). The presence of venous collaterals in the left upper quadrant (HR 2.32, 95% CI 1.11-4.85) was associated with decreased OS, but demonstrated fair reproducibility between readers (Kappa=0.38). Invasion of adrenal glands was also associated with decreased OS (HR 165, 95% CI 10.4-2646), however occurred infrequently (4/168) with fair reproducibility (Kappa=0.39). Tumor size was only significantly associated with decreased OS in patients who underwent upfront surgical resection (HR 2.30, 95% CI 1.19-4.42, kappa=0.49). Tumor contact with adjacent veins was not associated with decreased OS (HR 1.07, 95% CI 0.68-1.68, Kappa=0.44).

CONCLUSION

PDAC contact of any artery on preoperative CT is associated with shorter survival in resected PDAC patients. Tumor size was only associated with survival in the untreated resectable PDAC patients.

CLINICAL RELEVANCE/APPLICATION

Application of a PDAC reporting template may have a role in identifying predictors of survival that can aid in preoperative stratification of patients.

GI367-SD-MOA8 Non-Contrast MRI as a Sequential Imaging for Characterizing CT-Detected Arterial Enhancing-Only Nodules in Patients at Risk for HCC

Station #8

Participants
So Hyun Park, MD, Incheon, Korea, Republic Of (*Presenter*) Nothing to Disclose
Bohyun Kim, MD, Suwon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
So Yeon Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hye Jin Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jimi Huh, MD, Suwon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Kyung Won Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seung Joon Choi, Incheon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jai Keun Kim, MD, PhD, Suwon-si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine the feasibility of non-contrast MRI as a sequential imaging for characterizing CT-detected arterial-enhancing nodules that do not washout in patients at risk for HCC.

METHOD AND MATERIALS

We retrospectively recruited 194 arterial enhancing-only nodules (mean size, 1.5 cm; range, 0.5-3.2 cm) detected on multiphasic CT that were subsequently evaluated with gadoxetic acid-enhanced MRI in 175 treatment-naïve chronic liver disease patients (130 males and 45 females, mean age, 56.6±9.8 years) from three tertiary referral centers. The diagnosis of all 118 primary liver malignancies including 105 HCCs and 13 combined HCC-CC was made by surgical resection and percutaneous biopsy. Two radiologists assessed T2WI, DWI, T1 dual GRE images (Dual GRE), and hepatobiliay phase images (HBP) for the following findings in each nodule: mild-to-moderate hyperintensity on T2WI, hyperintensity on DWI, hypointensity on HBP, fat content on Dual GRE, non-enhancing capsule, hemorrhage, nodule-in-nodule, and mosaic appearance. Assuming the presence of any one of these findings indicates the diagnosis of HCC, per-lesion analyses were performed to determine the sequences most predictive of HCC.

RESULTS

Per-lesion sensitivity, specificity, and accuracy per number of the sequence used is as follows: one sequence, 89.5-93.3%, 79.8-83.1%, and 85.1-88.1%; two sequences, 88.6-95.2% 79.8-85.4%, and 86.6-89.2%; three sequences, 91.4-92.4%, 79.8-85.4%, and 86.6-88.7%; all four sequences. 93.3%, 79.8%, and 87.1%. The combination of T2WI, DWI, and Dual GRE showed the best performance for HCC diagnosis with sensitivity, specificity, and accuracy of 91.4%, 85.4%, and 88.7%. Applying the same provisional criteria for HCC to diagnose primary liver malignancy showed the sensitivity, specificity, and accuracy of 90.7%, 97.4%, and 93.3% when using the combination of T2WI, DWI, and Dual GRE. In nodules < 1 cm, adding HBP increased sensitivity up to 13% without decreasing the specificity and accuracy.

CONCLUSION

Non-contrast MRI protocol of T2WI, DWI, and Dual GRE showed reasonable performance for discriminating HCC and primary liver malignancies in CT-detected indeterminate arterial enhancing-only nodules of patients at risk for HCC. In nodules < 1 cm, HBP may still be needed to preserve the sensitivity.

CLINICAL RELEVANCE/APPLICATION

Abbreviated non-contrast MRI protocol could be used as a sequential imaging to characterize CT-detected arterial enhancing nodules.

GI368-SD-MOA9 Evaluation of Treatment Response in Phase IB of the Study of Patients with Advanced Melanoma Treated by CMP-001 in Combination with Pembrolizumab: Relationship with Pre-Treatment Tumor Burden (TB) Using Volumetric Computed Tomography (CT) Biomarkers

Station #9

Participants
Sina Houshmand, MD, Pittsburgh, PA (*Presenter*) Nothing to Disclose
Ryan Massa, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Mark A. Sparrow, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Huang Lin, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
David Mauro, Cambridge, MA (*Abstract Co-Author*) Nothing to Disclose
Diwakar Davar, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

houshmands@upmc.edu

PURPOSE

Advanced melanoma patients with increased hepatic metastases and total tumor burden (TB) have been shown to have reduced response rates to anti-PD1 treatment. Here we explore the predictive value of fractional baseline organ-specific TB acquired by volumetric computed tomography (CT) biomarkers in a subset of patients included in the phase IB study of anti-PD1 monoclonal antibody pembrolizumab and intratumorally injected Toll-like receptor 9 (TLR9) agonist CMP-001

METHOD AND MATERIALS

44 patients with advanced melanoma refractory to prior anti-PD1-therapy have been included. Volumetric assessment of baseline CT was performed using an advanced CT volumetric workstation to measure TB in viscera vs. lymph nodes and sub-cutaneous tissue. Fractional TB was calculated by dividing site-specific TB (viscera and LN/SQ) by total TB. Visceral fraction >0.3 and LN/SQ fraction >0.7 were defined as high. Survival analysis was performed, and progression-free survival (PFS) was calculated. Start date was defined as date of the first dose. Progression date was defined as date of last scan if the patient progressed. Date of last follow-up was selected as the later one between date of last scan and date of death. Kaplan-Meier plots were generated by visceral status and LN/SQ status (high vs. low)

RESULTS

Among 44 patients, two observations were deleted due to missing imaging data. Median follow-up time was 8.4 months (1st quartile 4.48, 3rd quartile 13.9) for this study. Higher visceral fraction (median 2.9 months, 95% confidence interval [CI] 2.7,+inf) was statistically significant associated with shorter PFS compared to lower visceral fraction (median 12.4 months, 95% CI 5.8,+inf; p=0.024). In contrast, LN/SQ PFS was longer in high fraction (median 12.43 months, 95% CI 8.4,+inf) compared to low fraction (median 4.6 months, 95%CI 2.8,+inf), although not statistically significant (p=0.096)

CONCLUSION

In volumetric CT analysis of subjects treated with the combination of pembrolizumab and CMP-001, high fraction of baseline visceral TB is associated with shorter PFS. On the other side, although not statistically significant, high fraction of baseline lymph node TB seems to be a favorable feature and is associated with longer PFS

CLINICAL RELEVANCE/APPLICATION

These results suggest that fractional organ-specific TB measured by volumetric CT is a potential prognostic marker in subjects with advanced melanoma treated with immunotherapy.

GI369-SD-MOA10 Mucinous Cystic Neoplasms of the Liver versus Simple Biliary Cysts: CT/MR Features and Inter-Reader Agreement

Station #10

Participants
Joshua T. Olson, MD, Rochester, MN (*Presenter*) Nothing to Disclose
James H. Boyum, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Shannon P. Sheedy, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Andrew Babcock, MD, Minneapolis, MN (*Abstract Co-Author*) Nothing to Disclose
Rondell Graham, MBBS, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Sudhakar K. Venkatesh, MD, FRCR, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

olson.joshua@mayo.edu

PURPOSE

Assess CT and MR features that may aid in differentiation of mucinous cystic neoplasms of the liver (MCN) from simple biliary cysts (SBC) and determine the inter-reader reliability of these features.

METHOD AND MATERIALS

A blinded, retrospective review of imaging in surgically resected, pathologically confirmed MCN (n=46) and SBC (n=57) was performed using CT (n=60), MR (n=11) or both (n=32) by 2 fellowship-trained radiologists. Features analyzed included: maximum cyst size and shape; homogeneity/heterogeneity of cyst contents; cyst wall thickness and calcifications; cyst septal location, thickness, regularity/irregularity and calcifications; presence of solid enhancing components; bile duct communication; protrusion of cyst into the bile duct; bile duct dilatation peripheral to the cyst; cyst restricted diffusion (MR); and total number of hepatic cysts. Inter-reader agreement was analyzed using kappa coefficient analysis. Chi-square analysis assessed for significant differences in occurrence of features between MCN and SBC using the senior reader's data.

RESULTS

Inter-reader agreement was substantial for CT features including septal calcification (0.88 [95% CI: 0.72, 1.00]) and cyst wall

calcifications (0.75 [95% CI: 0.56, 0.94]). Inter-reader agreement was also substantial for MR features including cyst protrusion into the biliary duct (0.78 [95% CI: 0.38, 1.00]), septal location (0.76 [95% CI: 0.56, 0.96]), cyst contents (0.73 [95% CI: 0.50, 0.95]), and communication with the distal bile duct (0.71 [95% CI: 0.34, 1.00]). A significant variance in septal features on MR was noted between MCN and SBC, including septal location (central and central + peripheral in 62% of MCN versus 22% of SBC [p = 0.02]), septal nodularity (42% irregular/nodular in MCN versus 6% in SBC [p=0.02]), and septal thickness (>3mm in 78% of MCN versus 9% of SBC [p=0.04]).

CONCLUSION

There is substantial inter-reader agreement on multiple CT and MR features shared by MCN and SBC. Among those, the MR septal features including location, nodularity, and thickness may help distinguish MCN from SBC.

CLINICAL RELEVANCE/APPLICATION

CT and MR features of cystic liver masses can help differentiate mucinous cystic neoplasms of the liver from simple biliary cysts.

GI370-SD-MOA11 Joint Segmentation and Classification of Hepatic Lesions in Ultrasound Images Using Deep Learning

Station #11

Participants
Hwaseong Ryu, Yangsan, Korea, Republic Of (*Presenter*) Nothing to Disclose
Jae Young Lee, MD,PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyo-Jin Kang, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Kyoung Mu Lee, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seung Yeon Shin, Seoul, Korea, Republic Of (*Abstract Co-Author*) Research Grant, Samsung Electronics Co, Ltd
Jonghyon Yi, PhD, Kyunggi-do, Korea, Republic Of (*Abstract Co-Author*) Employee, Samsung Electronics Co Ltd
Dong Hyuk Park, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To develop a convolutional neural network (CNN) model to jointly segment and classify a hepatic lesion selected by user clicks in ultrasound examination.

METHOD AND MATERIALS

4,309 anonymized ultrasound images of 3,873 unique patients with hepatic cyst (n=1,214), hemangioma (n=1,220), metastasis (n=1,001), or HCC (n=874) were collected and annotated. The images were divided into 3,909 training and 400 test images including 100 images for each lesion type, with no patient overlap. Our network is composed of one shared encoder and two inference branches which are respectively for segmentation and classification. The network takes as input the concatenation of an input image and two Euclidean distance maps of positive and negative clicks provided by a user. Simulated positive and negative clicks were used for training. For better generalization, the convolutional layers in the shared encoder were initialized using other network trained with breast ultrasound images. The performance of hepatic lesion segmentation was evaluated with Jaccard index (JI). Accuracy, sensitivity, specificity, and the area under the receiver operating characteristic curve (AUROC) for categorizing benign and malignant hepatic lesions and classifying four kinds of hepatic lesions were calculated.

RESULTS

We achieved performance improvements by jointly conducting two tasks. In segmentation only model, the mean JI was 68.5%. In classification only model, the accuracy of classifying benign and malignant lesions was 89.8% and that of classifying four kinds of hepatic lesions was 79.8%. Compared to this, mean JI and accuracy were 70.0% and 90.4% in the joint segmentation and classification model for classifying benign and malignant lesions. Similar results were also obtained for four kinds of hepatic lesions (mean JI: 68.4%, accuracy: 82.2%). The sensitivity, specificity, and the AUROC of classifying benign and malignant hepatic lesions were 95.0%, 86.0%, and 0.97. And those of classifying four hepatic lesions were 87.0%, 90.0%, and 0.95.

CONCLUSION

The proposed deep learning based system that simultaneously performs segmentation and classification of a hepatic lesion selected by a user in ultrasound images showed higher performance than segmentation only and classification only systems.

CLINICAL RELEVANCE/APPLICATION

The proposed system could assist the radiologists with little experience in ultrasound imaging with detecting hepatic lesions

GI288-ED-MOA12 Nodal Staging of Gastric Cancer: Pictorial Illustration

Station #12

Participants
Pulkit Maru, MBBS, Kolkata, India (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

drpulkitmaru@gmail.com

TEACHING POINTS

1. Lymphatic drainage of the stomach. 2. Updated AJCC (TNM) and Japanese Gastric Cancer Association nomenclature of regional and distant nodal stations. 3. To know the exact stations on cross sectional imaging. 4. Lymph node morphological features predicting metastatic nodal involvement. 5. Types of surgical nodal clearance for gastric cancer.

TABLE OF CONTENTS/OUTLINE

1. Anatomical definitions of lymph node stations (Japanese classification of gastric carcinoma: 3rd English edition (2011)) a. Perigastric nodes b. Second tier nodes c. Second tier or third tier nodes (according to site of primary tumour) d. Third tier or metastatic nodes 2. AJCC 8th Ed (TNM) staging - N stages 3. Lymph node morphology 4. Types of lymph node dissections (according to a. D1 b. D1+ c. D2 d. D3

GI283-ED- Learning to Ride the Wave: An Interactive Review of the Pitfalls in MR Elastography

MOA13

Station #13

Awards

Magna Cum Laude

Participants
Chenyang Zhan, MD,PhD, New York, NY (*Presenter*) Nothing to Disclose
Krishna Prasad Shanbhogue, MD, Jersey City, NJ (*Abstract Co-Author*) Nothing to Disclose
Myles T. Taffel, MD, New York City, NY (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Magnetic Resonance elastography (MRE) estimates tissue stiffness by evaluating mechanical shear wave propagation using motion-encoding gradients. Compared with other non-invasive imaging technique such as ultrasound-based transient elastography, MRE has higher accuracy for detection of liver stiffness. With the approval of CPT code for MRE and increasing prevalence of nonalcoholic steatohepatitis, it is expected that utilization of MRE will continue to grow. This interactive exhibit will provide a case based review of MR elastography interpretation. Cases that highlight the pitfalls in MR elastography will be discussed. Analysis of the technical aspects of MRE failure will also be presented.

TABLE OF CONTENTS/OUTLINE

The majority of the educational exhibit will be presented in case-based quiz format. Table of Contents/Outline:- Brief review of MR elastography mechanism/technique- Discussion of MR elastography interpretation- Alternative pathologies that mimic high liver stiffness- Artifacts & failed cases.5 figures in abstract:- MR elastography interpretation requires evaluation of multiple sequences- Heterogeneity of liver fibrosis - Focal hepatic lesion mimicking focal fibrosis- Artifacts mimicking high stiffness- High stiffness secondary to Budd-Chiari Syndrome.

GI284-ED-MOA14 MR Staging of Rectal Carcinoma: A Case-Based Approach

Station #14

Participants
Neeraj Lalwani, MD, Winston Salem, NC (*Presenter*) Nothing to Disclose
David D. Bates, MD, Hastings On Hudson, NY (*Abstract Co-Author*) Research support, General Electric Company
Elena K. Korngold, MD, Portland, OR (*Abstract Co-Author*) Nothing to Disclose
Hina Arif, Tucson, AZ (*Abstract Co-Author*) Nothing to Disclose
Ashish R. Khandelwal, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Mark E. Lockhart, MD, Birmingham, AL (*Abstract Co-Author*) Author, Oxford University Press; Author, Reed Elsevier; Editor, John Wiley & Sons, Inc; Deputy Editor, Journal of Ultrasound in Medicine

For information about this presentation, contact:

nlalwani@wakehealth.edu

TEACHING POINTS

The concept of mesorectum, The radiological appearance of mesorectum on MRI, Practical implications of radiological anatomy in staging rectal cancer and management, How to accurately stage rectal cancer on MRI?, Peals and pitfalls.

TABLE OF CONTENTS/OUTLINE

Understanding the anatomy of mesorectum, Staging of rectal cancer, T1 vs T2, T3 vs T4, Good vs. bad T3, T4a vs. T4b, Characteristics of suspicious nodes, Pelvic side wall nodes: Locaoregional vs metastatic, EMVI, Learning staging of rectal carcinoma and review selected cases

GI285-ED-MOA15 MRI of Abdominal and Pelvic Tumors in Pregnancy

Station #15

Participants
Nikhar Kinger, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Ilkyu D. Oh, BA, Suwanee, GA (*Abstract Co-Author*) Nothing to Disclose
Courtney C. Moreno, MD, Suwanee, GA (*Abstract Co-Author*) Nothing to Disclose
Frank H. Miller, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Pardeep K. Mittal, MD, Augusta, GA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

nkinger@emory.edu

TEACHING POINTS

Review the imaging of pregnant patients Demonstrate the appearance of tumors in pregnant patients Characterize both benign and malignant tumors during pregnancy

TABLE OF CONTENTS/OUTLINE

Choosing between imaging modalities such as MRI, CT, ultrasound, and radiography for pregnant patients. MRI protocolling for pregnant patients with sequences such as T2, fat suppressed T2, T1 precontrast, in and out of phase, diffusion, and thin slice T2 images. MR imaging characterization of benign and malignant abdominal and pelvic tumors. Most common tumors in pregnancy are generally benign and include fibroids, corpus luteum cysts, and desmoid tumors. Malignant tumors include breast cancer and cervical cancer. The effects of pregnancy on these tumors. Treatment of tumors during pregnancy. Conclusions.

GI286-ED-MOA16 Let's Get to the Bottom of This: Updated Review of MRI Defecography in Males and Females

Station #16

Participants
Soumya Maddula, MD, New York, NY (*Presenter*) Nothing to Disclose
Ilana Kafer, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

-Learn basic anatomy of the pelvic floor and its functional role in defecation in female and male patients. -Identify the various organs and muscles which separate the compartments of the pelvic floor. -Refresh on protocols utilized specifically at our institution and discuss protocol options -Understand normal and abnormal function and movement of pelvic floor muscles. -Identifying common pelvic floor pathology by compartment in both female and male patients.

TABLE OF CONTENTS/OUTLINE

I. Overview of Terminology II. Female Pelvic Floor Anatomy II. Male Pelvic Floor Anatomy III Review of Normal Pelvic Floor function IV. Interpreting Normal MR Imaging Findings V. Pathology by compartment a. Anterior Compartment i. Cystocele ii. Urethral hypermobility b. Middle Compartment i. Cervical prolapse c. Posterior compartment i. Rectocele ii. Intussusception iii. Dyssynergic Defecation d. 'Fourth Compartment' i. Enterocele ii. Peritoneocele

Printed on: 10/29/20

GIS-MOB

Gastrointestinal Monday Poster Discussions

Monday, Dec. 2 12:45PM - 1:15PM Room: GI Community, Learning Center

ER GI

AMA PRA Category 1 Credit ™: .50

FDA Discussions may include off-label uses.

Participants

Jennifer W. Uyeda, MD, Boston, MA (*Moderator*) Consultant, Allena Pharmaceuticals, Inc

Sub-Events

GI341-SD-MOB1 Radiographic Follow-Up of Pancreatic Cystic Lesions: Are Follow-Up Recommendations Excessive?

Station #1

Participants
N. Masoom, MD, Burlington, MA (*Presenter*) Nothing to Disclose
Temilola Akinola, MD,MPH, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Jaclyn A. Therrien, DO, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Jalil Afnan, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jalil.afnan@lahey.org

PURPOSE

Evaluate the validity of recommended follow-up for incidental pancreatic cystic lesions on MRI.

METHOD AND MATERIALS

A five-year retrospective review of pancreatic cystic lesions on MR cholangiopancreatography (MRCP) was undertaken for 285 patients over a 5 year period. Cyst size, location and concerning features such as main duct dilatation, intralesional solid component and enhancement were reviewed over time and any changes documented. Clinical notes were reviewed for EUS and FNA results.

RESULTS

169 female and 116 male patients (mean age 65 years) were evaluated with median and mean follow up of 22 and 31 months. Average largest initial cyst size was 12.3 mm. 23 cases (8%) underwent endoscopic ultrasound (EUS) with fine-needle aspiration (FNA), for concerning features, including contrast enhancement (7 cases) and pancreatic ductal dilatation either focal (19 cases) or diffuse (24 cases), 2 cases had both features. The average size of the cysts that developed worrisome features requiring further workup was 26.1mm. Only one case was less than 10mm. 6 EUS cases were non-diagnostic (unsuccessful cyst aspiration, or insufficient tissue for diagnosis). Of the remaining cases, 11 (65%) had malignant or potentially malignant pathology; ductal adenocarcinoma (3 cases), mucinous cystadenoma (6 cases) and IPMN (2 cases). Additionally serous cystadenoma (3 cases) and non-malignant ductal cells with negative mucin stain (3 cases). 139 cases (49%) showed a change in size; 85 increased (mean, 5 mm); and 54 decreased (mean, 8.1 mm). Of 155 patients with cysts <=10 mm, 138 (90%) had no change or decreased in size over 5 years. The remaining 10% exhibited a mean change of 1mm.

CONCLUSION

In this retrospective, longitudinal review of incidental pancreatic cystic lesions on MRI, the development of suspicious features in a sub centimeter lesion is rare. A follow-up MRI at 2 years, and at 5 years is likely sufficient, if there has been no change in size or appearance. For lesions greater than 2 cm, or those lesions with suspicious features, earlier intervention with EUS and aspiration is proposed to more accurately define the lesion and management plan.

CLINICAL RELEVANCE/APPLICATION

Improve recommendations for follow-up and management of incidental pancreatic cystic lesions, to enhance patient care and minimize unnecessary imaging.

GI342-SD-MOB2 Predictive and Prognostic Value of CT-Based Radiomics Model for Lymph Node Metastasis in Esophageal Squamous Cell Cancer

Station #2

Participants
Nian Lu, Guangzhou, China (*Presenter*) Nothing to Disclose
Weijing Zhang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Shenghai Zhang, Shenzhen, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

lunian@sysucc.org.cn

PURPOSE

To develop and validate a radiomics nomogram for preoperative prediction and prognosis of lymph node metastasis (LNM) in patients with esophageal squamous cell cancer (ESSC).

METHOD AND MATERIALS

Three hundred and seven patients with clinicopathologically confirmed ESSC were divided randomly into a training set (n=200) and a validation set (n=107). Data was gathered from March 2009 to September 2013. Clinical characteristics, including age, sex, clinical stage and histologic grade, were constructed a clinical data model by Cox proportional hazard model. Radiomic features of lymph nodes, pathologically diagnosed positive or negative, were extracted from portal venous-phase computed tomography (CT) of ESSC for survival analysis. Radiomics signature was built using LASSO Cox regression. Two radiomics nomograms were developed incorporating the radiomics signature and selected clinical predictors based on Cox proportional hazard model. Nomogram discrimination, calibration and clinical usefulness were evaluated. Associations between radiomics features and clinical data were investigated using heatmaps. Internal validation was assessed.

RESULTS

The radiomics signatures, which consisted of 13 selected features, were significantly associated with OS, with a C-index of 0.709. N-staging showed highest prognostic value among the clinical factors. One radiomics nomogram was incorporated radiomics signature with the TNM staging system. This nomogram showed a significant improvement for prognosis of LNM over the TNM staging system only in terms of evaluating OS in the training cohort (C-index, 0.844 vs. 0.830; P <0.05). Another radiomics nomogram combined the radiomics signature with all clinical data showed good discrimination, with a C-index of 0.866 (95% CI: 0.836-0.897). Application of the nomogram in the validation cohort still gave good discrimination (C-index, 0.781; 95% CI: 0.717-0.845) and good calibration. Heatmaps revealed associations between radiomics features and tumor stages.

CONCLUSION

CT-based radiomics nomograms provided improved prognostic ability for LNM in ESSC, which may provide evidence for precision medicine and affect treatment strategies.

CLINICAL RELEVANCE/APPLICATION

Esophageal cancer is the sixth most fatal cancer globally and new approaches, radiomics, are urgently needed to identify patients who are at risk of poor prognosis.

GI343-SD-MOB3 Comparison and Correlation of Attenuation Values on Virtual and True Non-Contrast Images Obtained by Triphasic Dynamic Series with Third-Generation Dual-Source Dual-Energy CT

Station #3

Participants
Sungmin Kim, MD, Ulsan, Korea, Republic Of (*Presenter*) Nothing to Disclose
Tae Young Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Byeong Seong Kang, Ulsan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Woon-Jung Kwon, MD,PhD, Ulsan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Minseo Bang, Ulsan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Soyeoun Lim, MD, Ulsan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Gyeong Min Park, MD, Ulsan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the agreement and correlation between the true non-contrast attenuation values of intra-abdominal structures and attenuation values obtained on virtual non-contrast images based on 3rd generation dual source dual-energy CT.

METHOD AND MATERIALS

Seventy seven patients who underwent triphasic abdominal CT (liver dynamic protocol) between November 2018 and January 2019 were retrospectively reviewed. Unenhanced series was performed using conventional single-energy mode at 120 kVp. Arterial, venous phase and 5 minutes delayed phase post-contrast series were obtained utilizing dual source dual-energy CT technique (tube potential, 100 kVp and Sn 150 kVp). Virtual non-contrast images were processed off of arterial (VNC-art), venous phase (VNC-por) and 5 minutes delayed (VNC-del) series. Attenuation values of liver, pancreas, kidneys, muscle, subcutaneous fat intraabdominal fat, vertebra, aorta, IVC, main portal vein, intrahepatic portal vein were recorded on true non-contrast study and virtual non-contrast study sets of images. Attenuation values were compared using paired t test. The correlations of attenuation values were also evaluated via the Pearson's correlation coefficient.

RESULTS

Paired t test showed significant difference between TNC, VNC-art, VNC-por and VNC-del attenuation across all organs ($p < 0.0001$). But there were excellent correlations between TNC and VNC-art attenuation values of liver ($r = 0.907$- 0.924), pancreas ($r = 0.718$), spleen ($r = 0.728$) and subcutaneous fat ($r = 0.953$). There were excellent correlations between TNC and VNC-por attenuation values of liver ($r = 0.880$ - 0.926), pancreas ($r = 0.846$), vertebra ($r = 0.919$) and subcutaneous fat($r = 0.939$). There were also excellent correlations between TNC and VNC-del attenuation values of liver, ($r = 0.885$ - 0.919), pancreas ($r = 0.777$) vertebra ($r = 0.914$) and subcutaneous fat($r = 0.957$).

CONCLUSION

Although the attenuation values of all tissues were significantly different between virtual non-contrast and true non-contrast images, the correlation values were excellent. The true non-contrast attenuation values of liver, spleen, pancreas, vertebra and subcutaneous fat can be obtained by regression analysis. Further optimization of post-processing algorithms might be necessary before complete replacement of TNC with VNC images.

CLINICAL RELEVANCE/APPLICATION

This will be helpful for diagnosis and evaluation of fatty liver on vertual non-contrast study.

GI371-SD-MOB4 Preoperative MR Enterography in Predicting Early Anastomotic Recurrence after Primary Intestinal

Resection in Crohn's Disease

Station #4

Participants
Xuehua Li II, Guangzhou, China (*Presenter*) Nothing to Disclose
Siyun Huang, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Zhuangnian Fang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Bao Lan Lu, Guangzhou , China (*Abstract Co-Author*) Nothing to Disclose
Jixin Meng, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Shiting Feng, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Ziping Li, MD, PhD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

lixuehua803@163.com

PURPOSE

Up to 70% of patients with Crohn's disease (CD) who had underwent primary bowel resection will develop postoperative recurrence. Stratifying CD patients according to the risk of recurrence and tailoring therapy are the ideal and most cost-effective ways to manage these patients. The aim of this preliminary study was to explore whether preoperative MR enterography (MRE) can predict early anastomotic recurrence after primary bowel resection in CD patients.

METHOD AND MATERIALS

32 CD patients who underwent preoperative MRE and primary bowel resection were enrolled. We defined early anastomotic recurrence as postoperative endoscopic Rutgeerts score>=i2 or bowel wall thickening/high enhancement on CT/MRE within 6 months. MRE including resected bowel (wall thickness, bowel obstruction, bowel edema, enhanced pattern, DWI hyperintensity and ADC) and perienteric mesentery (mesenteric edema, perienteric effusion, comb sign, creeping fat, fistula/abscess, DWI hyperintensity) was retrospectively analyzed. Logistic regression analysis was used to develop a predictive model for recurrence.

RESULTS

Of 32 CD patients, 20 (62.5%) had early anastomotic recurrence and were defined as R+ group, the other 12 patients were defined as R- group. Significant differences in creeping fat (P=0.024), mesenteric abscess/fistula (P=0.036), bowel obstruction (P=0.036) and mesenteric hyperintensity on DWI (P=0.044) were found between R+ and R- group. Early anastomotic recurrence correlated positively with creeping fat (r=0.469, P=0.007), mesenteric abscess/fistula (r=0.437, P=0.012), bowel obstruction (r=0.423, P=0.016) and mesenteric hyperintensity on DWI (r=0.437, P=0.012). The results from the MRE-based predictive model (=2.597×creeping fat+2.256×mesenteric abscess/fistula+2.493×bowel obstruction-4.675) strongly correlated with the recurrence outcome (r=0.683,P<0.001) in these 32 patients with an area under ROC curve of 0.902 (95% CI, 0.793-1.000; P<0.001).

CONCLUSION

Preoperative MRE can predict early anastomotic recurrence after primary bowel resection in CD patients. Mesenteric abnormality seems to be a more important risk factor for early anastomotic recurrence.

CLINICAL RELEVANCE/APPLICATION

Preoperative MRE can predict early anastomotic recurrence after primary bowel resection in CD patients and stratifies them according to the risk of recurrence for tailoring therapy

GI372-SD-MOB5 Computed Tomography (CT) Determined Pancreatic Volume and Steatosis as a Discriminant Marker for Diagnosis of Type II Diabetics versus Non-Diabetic Controls

Station #5

Participants
Ashish Dua, MBBS, Panchkula, India (*Presenter*) Nothing to Disclose
Ravinder Kaur, Chandigarh, India (*Abstract Co-Author*) Nothing to Disclose
Suman Kochhar, Chandigarh, India (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

drashishdua@gmail.com

PURPOSE

To study the computed tomographic (CT) indices of pancreatic volume and fat content in patients with type II diabetes mellitus and compare it with age and body mass index (BMI) matched non-diabetic patients

METHOD AND MATERIALS

We prospectively evaluated 66 diabetic patients (42 females, 24 males, mean age 53.2 ± 7.9 years) and 47 non-diabetic patients (20 females, 27 males, mean age 50 ± 8.2 years) between the age group of 40-65 years who underwent unenhanced CT scan of the abdomen using a 64-slice Multi Detector CT (MDCT) machine (Ingenuity CT, Philips) for unrelated pathologies. The cases had adequately controlled blood sugar levels, while none of the cases or controls had any kind of systemic co-morbidities. The following parameters were noted: Pancreatic volume (using an inbuilt volume application in CT) Pancreatic fat indirectly as: Difference between pancreatic attenuation and splenic attenuation (HU P-S) and Ratio of pancreatic attenuation to splenic attenuation (HU P/S) After age, gender and BMI matching, T test was applied for calculating p-value of pancreatic volume and Mann-Whitney test for calculating the p values of HU P-S and HU P/S. Spearman's rho coefficient was calculated to see the relationship of pancreatic volume with HU P-S and HU P/S. Receiver Operating Curve (ROC) was made for finding the cut-off value of pancreatic volume with optimal sensitivity and specificity.

RESULTS

CT showed that pancreatic volume was significantly low (p<0.001) in patients with type 2 diabetes mellitus (48±13.7) as compared to non-diabetic patients (63.6±17.3). Further, fat content was also significantly high (p<0.001) in diabetic patients (HU P-S of -13.2±7.9 and HU P/S of 0.73±0.15) as compared to non-diabetic patients (HU P-S of -6.7±5.9 and HU P/S of 0.86±0.12). Thus,

changes in pancreatic volume and fat act as a surrogate marker for type 2 diabetes mellitus.

CONCLUSION

Low pancreatic volume and a high fat content quantified by using CT are significantly associated with existence of type II diabetes mellitus

CLINICAL RELEVANCE/APPLICATION

These changes if found in a high-risk individual incidentally who undergoes CT scan of abdomen for an unrelated pathology, would help in early diagnosis of diabetes mellitus as it would prompt a complete biochemical work up. Thus, disabilities and complications related to long standing diabetes can be prevented efficiently in a significant chunk of population.

GI373-SD-MOB6 Structured Reporting of CT or MRI for Perihilar Cholangiocarcinoma: Usefulness for Clinical Planning and Interdisciplinary Communication

Station #6

Participants
Seungbaek Hong, MD, Pusan, Korea, Republic Of (*Presenter*) Nothing to Disclose
Suk Kim, MD, Pusan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Nam Kyung Lee, MD, Busan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Il Wan Son, MD, Busan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

cinematiclife7@hanmail.net

PURPOSE

To evaluate the effect of the structured reports compared with the narrative reports for reporting CT or MRI in patients with perihilar cholangiocarcinoma.

METHOD AND MATERIALS

This retrospective study included 54 patients (37 men, 17 women; mean age, 75.6 years) with perihilar cholangiocarcinoma. All patients performed CT or MRI before endoscopic retrograde cholangiopancreaticography (ERCP) or surgery. For all patients, we generated the narrative reports and structured reports for perihilar cholangiocarcinoma. We compared the number of key features between the two types of reports. In addition, one experienced abdominal surgeons and two physicians experienced in ERCP reviewed a questionnaire with 3 questions including sufficiency of information regarding surgical or procedural planning, the effort for the information extraction, and report quality rated on Likert scale (1, insufficient; 6, excellent).

RESULTS

Structured reports (mean±SD, 6.89±0.31) included significantly more predefined key features compared with the narrative reports (mean±SD, 5.87±0.70)($p<0.001$). The structured reports was considered to provide the sufficient information for ERCP or surgery in 89.9% of cases (versus only 18.5% of cases in narrative reports) ($p<0.001$). Regarding the effort for the information extraction, 94.4 % of structured reports was considered to be easy, but only 9.3% of narrative reports were considered to be easy ($p<0.001$). In addition, structured reports (mean±SD, 5.96±0.19) received the higher overall report quality rate compared with narrative reports (mea±SD, 4.31±0.77) ($p<0.001$).

CONCLUSION

Structured reporting of CT or MRI for hilar cholangiocarcinoma can provide more predefined key features, more sufficient information, and higher satisfaction level to referring clinician, compared to the narrative report.

CLINICAL RELEVANCE/APPLICATION

In patient with hilar cholangiocarcinoma, structured reporting of CT or MRI can provide improved report quality. Therefore, referring clinicians are more confident about further clinical decision making.

GI374-SD-MOB7 Deep Learning-Assisted Diagnosis of Atypical Hepatocellular Carcinoma (HCC) on Contrast-Enhanced MR Imaging: Differentiating Pathologically Proven HCC from Non-HCC Liver Lesions

Station #7

Participants
Paula Marie Oestmann, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Clinton Wang, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Lynn J. Savic, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Charlie Hamm, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Sophie Stark, Freiburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Isabel T. Schobert, BS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Todd Schlachter, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Guerbet SA
Ming de Lin, PhD, North Haven , CT (*Abstract Co-Author*) Employee, Visage Imaging, Inc; Former Employee, Koninklijke Philips NV
Jeffrey C. Weinreb, MD, New Haven, CT (*Abstract Co-Author*) Consultant, Bayer AG
Ramesh Batra, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
David Mulligan, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Xuchen Zhang, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
James S. Duncan, PhD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Julius Chapiro, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Guerbet SA; Consultant, Guerbet SA; Research Grant, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Research Grant, Boston Scientific Corporation;
Brian S. Letzen, MD, Orange, CT (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

julius.chapiro@yale.edu

PURPOSE

To train a deep learning model to differentiate between hepatocellular carcinoma (HCC) and non-HCC lesions on multi-phasic contrast-enhanced magnetic resonance imaging (MRI), using pathologically proven liver lesions as the "ground truth".

METHOD AND MATERIALS

This IRB-approved retrospective study included 118 patients with 93 (62%) HCC and 57 (38%) non-HCC lesions, all of which were pathologically confirmed and clearly localizable on MRI. Histopathological data was obtained from biopsies (n=72), resections (n=29), liver transplants (n=46), and autopsies (n=3). The non-HCC class included intrahepatic cholangiocarcinoma (n=19), regenerative nodules (n=2), dysplastic nodules (n=2), hemangioma (n=16), cysts (n=15), focal nodular hyperplasia (n=2) and bile duct adenoma (n=1). 47% of HCC lesions showed atypical imaging features (not meeting Liver Imaging Reporting and Data System [LI-RADS] criteria for definitive HCC or LR5). A 3D convolutional neural network (CNN) was trained on 140 lesions and tested for its ability to classify 10 remaining unseen lesions (5 HCC and 5 non-HCC). The CNN consisted of 3 convolutional layers, 2 maximum pooling layers, and 2 fully connected layers. An Adam optimizer was used for model training. The performance of the model was averaged over 150 runs with random sub-sampling to provide class-balanced test sets.

RESULTS

The CNN demonstrated an overall accuracy of 87.3%. The sensitivities for HCC and non-HCC lesions were 92.7% and 82.0%, respectively. Correspondingly, specificities of HCC and non-HCC lesions were 82.0% and 92.7%, respectively. The area under the receiver operating curve was 0.912. The training time of the CNN was 3.2 minutes ± 0.9, and the time to classify each lesion in the test data set was 2.9 ms ± 1.7.

CONCLUSION

This study provides proof-of-concept for CNN-based classification of both typical and atypical-appearing HCC lesions on multi-phasic MRI, utilizing pathologically confirmed lesions as "ground truth".

CLINICAL RELEVANCE/APPLICATION

A CNN trained with pathological "ground truth" can correctly classify HCC lesions that do not meet established imaging diagnostic criteria, potentially expanding the role of image-based diagnosis.

GI375-SD-MOB8 CT Radiomics Features Enhance Preoperative Survival Prediction in Patients with Pancreatic Ductal Adenocarcinoma

Station #8

Participants
Seyoun Park, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Jonathan Sham, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Satomi Kawamoto, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Alex Blair, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Noah Rozich, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Daniel Fadaei Fouladi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Shahab Shayesteh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Alejandra Blanco, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Saeed Ghandili, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ralph H. Hruban, Baltimore, MD (*Abstract Co-Author*) Board Member, miDiagnostics
Kenneth Kinzler, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bert Vogelstein, MD, Baltimore, MD (*Abstract Co-Author*) Founder, Personal Genome Diagnostics, Inc; Founder, Thrive Scientific; Advisor, Sysmex Corporation; Advisor, Eisai Co, Ltd; Advisor, CAGE; Advisor, Neophore; Advisor, Nexus; License agreement, Personal Genome Diagnostics, Inc; License agreement, Thrive Scientific; License agreement, Sysmex Corporation; License agreement, Eisai Co, Ltd; License agreement, CAGE; License agreement, Neophore; License agreement, Nexus
Elliot K. Fishman, MD, Owings Mills, MD (*Abstract Co-Author*) Institutional Grant support, Siemens AG; Institutional Grant support, General Electric Company; Co-founder, HipGraphics, Inc
Jin He, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Linda C. Chu, MD, Lutherville, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

lindachu@jhmi.edu

PURPOSE

Pancreatic ductal adenocarcinoma (PDAC) is a highly lethal malignancy with limited preoperative predictors of long-term survival. Existing nomograms incorporate post-resection data and are of limited utility in guiding surgical decision making. The purpose of this study is to evaluate the prognostic utility of preoperative CT radiomics features in predicting postoperative survival of PDAC patients.

METHOD AND MATERIALS

125 patients with surgically resected pancreatic ductal adenocarcinoma (PDAC) and preoperative dual-phase CT between 2010 and 2014 were retrospectively identified. Demographic, clinical parameters, baseline CA 19-9, tumor size, and patient survival were collected from the medical records. Patients were risk stratified based on survival time after surgery into low-risk group (survival time > 900 days) and high-risk group (survival time < 350 days). The whole 3D volume of pancreatic tumor and background pancreas were manually segmented (Velocity, Varian Medical Systems). 489 radiomics features were extracted from the whole pancreas boundary. Feature reduction was performed by minimum-redundancy maximum-relevance selection and random forest method, and the 10 most relevant radiomics features were selected. Survival analysis was performed based on clinical parameters with and without the addition of the 10 radiomics features. Survival status and time were computed by 4-fold cross validation. Concordance index (C-index) was used to evaluate performance of the survival prediction.

RESULTS

Mean age of PDAC patients was 67 ± 11 years. Mean tumor size was 3.3 ± 1.5 cm. The 10 radiomics features showed 82% accuracy in classification of high-risk vs. low-risk groups. C-index of survival prediction with only clinical parameters was 0.71. Addition of CT radiomics features improved C-index to 0.75.

CONCLUSION

Addition of CT radiomics features to standard clinical factors improves survival prediction in PDAC patients.

CLINICAL RELEVANCE/APPLICATION

Radiomics features from preoperative CTs of pancreatic ductal adenocarcinoma patients may be useful in risk stratification prior to planned resection for pancreatic cancer.

GI376-SD-MOB9 CT Texture Analysis May Predict Therapeutic Response of HCCs to Transcatheter Arterial Chemoembolization

Station #9

Participants
Jan Vosshenrich, MD, Basel, Switzerland (*Presenter*) Nothing to Disclose
Christoph J. Zech, MD, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Tuyana Boldanova, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Markus Heim, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Daniel T. Boll, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jan.vosshenrich@usb.ch

PURPOSE

To investigate the value of CT texture analysis of pretherapeutic dynamic CT for prediction of therapeutic response of hepatocellular carcinoma (HCC) to transcatheter arterial chemoembolization (TACE) according to mRECIST.

METHOD AND MATERIALS

Pre- and posttherapeutic dynamic (4-phase) CT scans of 91 biopsy proven HCCs in 37 patients treated with TACE were retrospectively analyzed. Patients with and without liver cirrhosis were included. Pretherapeutic CT was performed directly prior to TACE, first posttherapeutic imaging four weeks after TACE. Subsequent monitoring occurred at 3-month intervals. Each HCC was manually segmented on arterial phase images according to mRECIST criteria. Measurements and quantitative texture features were extracted and included: long axis (LA), Mean of positive Pixels (MPP) and Uniformity of positive Pixel Distribution (UPP). Predictive factors for Complete Response (CR) were assessed.

RESULTS

For initial posttherapeutic imaging (< 6 months), smaller tumor size, higher arterial enhancement and higher homogeneity at baseline were significantly associated with and predictive for CR of HCCs in cirrhotic livers: 1st exam post TACE - LA (19.4 vs 48.3 mm), MPP (192.1 vs 101.6), UPP (0.021 vs 0.017); 2nd exam post TACE - LA (21.7 vs 39.4 mm), MPP (262.1 vs 101.1), UPP (0.023 vs 0.017). On all imaging later than 6-months post TACE, CR was independent of baseline tumor size and homogeneity. However, the higher the mean pretherapeutic MPP, the longer a complete response of HCC lesions to TACE therapy could be observed (Follow Up 3: 290.3; FU 4: 357.4; FU 5: 389.3; FU 6: 463.4; FU 7: 459.4; FU 8: 545.5). Results of texture analysis of HCCs in non-cirrhotic livers were discordant as lesions were generally bigger at baseline and only a subtle, nonsignificant tendency to achieve CR with higher baseline MPP could be observed emphasizing different tumor biology, depending on underlying global liver disease.

CONCLUSION

Pretherapeutic texture analysis of multiphase CT-imaging may be helpful to predict Complete Response of HCC to TACE in cirrhotic livers. Long term CR of a treated lesion seems to significantly depend on high arterial enhancement at baseline and may also be associated with smaller tumor size.

CLINICAL RELEVANCE/APPLICATION

Pretherapeutic CT texture analysis in HCC patients could be a valuable tool for radiologists and clinicians in multidisciplinary conferences when triaging patients to TACE.

GI377-SD-MOB10 Liver, Spleen Stiffness Measurements, and Their Derivatives as Noninvasive Predictors of Esophageal and High-Risk Esophageal Varices Using 2D-Shear Wave Elastography in B-Viral Cirrhotic Patients

Station #10

Participants
Sanghyeok Lim, MD, Gyeonggi-do, Korea, Republic Of (*Presenter*) Nothing to Disclose
Yongsoo Kim, Guri, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Youngseo Cho, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

parcel79@gmail.com

PURPOSE

To evaluate the prognostic value as noninvasive predictors of esophageal varices (EVs) and high risk EVs among liver stiffness (LS), spleen stiffness (SS) measurements and their derivatives including liver stiffness-spleen size-to-platelet ratio risk score (LSPS) and spleen stiffness-spleen size-to-platelet ratio risk score (SSPS) using 2D-shear wave elastography in B-viral cirrhotic pateints.

METHOD AND MATERIALS

In this retrospective study, from April 2017 to October 2018, a total of 65 B-viral cirrhotic patients who underwent the liver, spleen stiffness measurement by 2D-SWE and endoscopic evaluation for EVs were enrolled. LSPS and SSPS were calculated using following fomulas: LS value × spleen diameter (cm)/platelet count (109/L) and SS value × spleen diameter (cm)/platelet count (109/L), respectively. Cutoff values of predicting presence of EVs and high risk EVs were identified by the Youden index and prognostic values were assessed by the area under the receiver operating characteristic curve (AUC).

RESULTS

Twenty six patients had no EV on endoscopy. Among 39 patients who had EVs, 12 patients had high risk EVs. The optimal cutoff values of LS value, SS value, LSPS and SSPS for predicting EVs were 9.9 (kPa), 29.9 (kPa), 0.8 and 3.7, respectively, at which AUC, 0.72, 0.77, 0.80 and 0.85, respectively. The optimal cutoff values of LS value, SS value, LSPS and SSPS for predicting high risk EVs were 15.4 (kPa), 34.9 (kPa), 1.3 and 4.4, respectively, at which AUC, 0.55, 0.78, 0.67 and 0.80, respectively.

CONCLUSION

LS, SS values and their derivatives including LSPS and SSPS were defined as noninvasive and useful methods to predict EVs and high risk EVs in B-viral cirrhotic patients.

CLINICAL RELEVANCE/APPLICATION

There had been many efforts to define a noninvasive and accurate method to predict esophageal varices and high risk esophageal varices surrogate invasive procedure including endoscopy. Authors of the present study found LS, SS values, LSPS and SSPS can be used as a good predictor for EVs as well as high risk EVs.

GI294-ED-MOB11 The ABC of Birt-Hogg-Dube: A Brief Overview

Station #11

Participants
Ozair A. Rahman, MBBS, New York, NY (*Presenter*) Nothing to Disclose
Monica P Goldklang, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Jeanine M. D'Armiento, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Firas S. Ahmed, MBChB, MPH, New York, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

oar9003@nyp.org

TEACHING POINTS

Clinical Findings Skin findings Spontaneous pneumothoraces Renal tumors Genetic analysis Similarities to and difference from tuberous sclerosis complex Renal Tumors Hybrid histological tumor types Conventional tumor types MRI/CT findings Management Standard current therapies Investigational therapies

TABLE OF CONTENTS/OUTLINE

Background Birt Hogg Dube (BHD) syndrome is a multi-system, autosomal dominant disease process that manifests with multiple clinical and radiographic findings including; cutaneous skin findings, renal lesions, pulmonary cysts, and spontaneous pneumothorax. In addition to renal cysts, BHD patients presents with renal masses including oncocytoma, chromophobe renal cell carcinoma, clear cell renal cell carcinoma and hybrid renal lesions. Numerous pulmonary cysts are important diagnostic criteria. Patient may present with spontaneous pneumothoraces. , and may be found incidentally in individuals undergoing screening for renal masses. Purpose The purpose of this educational exhibit is to discuss what radiologist needs to know about BHD syndrome, including the radiological findings that may help making the diagnosis. We also aim to discuss the critical management of renal masses among patients with BHD syndrome.

GI291-ED-MOB12 You Are at the Crossroads: Where Will You Go Next? - A Comprehensive Review of Currently Available Guidelines for Diagnosis and Management of Pancreatic Cystic Lesions

Station #12

Awards
Cum Laude

Participants
Yashant Aswani, MBBS, San Antonio, TX (*Presenter*) Nothing to Disclose
Julia Kirsten, BS, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Anil K. Dasyam, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Hari Sayana, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Sukeshi Arora, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Danielle Fritze, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Ravi K. Kaza, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
Alexander S. Somwaru, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Venkata S. Katabathina, MD, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

katabathina@uthscsa.edu

TEACHING POINTS

Compare and contrast the currently available guidelines regarding diagnosis & management of pancreatic cysts (American College of Gastroenterology, Fukuoka, ACR, European Study Group & American Gastroenterological Association) • Discuss characteristics of pancreatic cysts & their unique pathologic & imaging findings with special emphasis on role of imaging • Discuss our institutional working group guidelines for pancreatic cysts

TABLE OF CONTENTS/OUTLINE

Introduction What is the end point of pancreatic cyst follow-up? Early pancreatic cancer Characteristics of pancreatic cysts Pseudocysts, Serous cystadenomas, Mucinous cystic neoplasms, Intraductal papillary mucinous neoplasms (IPMNs): Side duct & Main duct, Solid-pseudopapillary neoplasms Cystic pancreatic neuroendocrine tumors Imaging Techniques: CT, MRI with MRCP & EUS Comparison of the available guidelines for pancreatic cysts Incidental pancreatic cyst on CT/US: What next? The role of imaging. Genetic testing for pancreatic cysts: Current Status Institutional Working Group on Management of Pancreatic Cystic lesions Conclusion Currently, there are five major society guidelines for the diagnosis and management of pancreatic cystic lesions. Although the goal of all these guidelines is early identification of pancreatic ductal adenocarcinoma, they vary significantly in their

approach to problem.

GI289-ED-MOB13 Guidelines for the Imaging of Patients with Clinically Suspected Chronic Pancreatitis or Patients at Risk of Chronic Pancreatitis

Station #13

Participants
Milda Dedelaite, MD, Aalborg, Denmark (*Presenter*) Nothing to Disclose
Soren Schou Olesen, Aalborg, Denmark (*Abstract Co-Author*) Nothing to Disclose
Fatih Akisik, MD, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose
Ingfrid H. Haldorsen, MD, Bergen, Norway (*Abstract Co-Author*) Nothing to Disclose
Asbjorn Mohr Drewes, MD,PhD, Aalborg, Denmark (*Abstract Co-Author*) Nothing to Disclose
Jens Brondum Frokjer, MD, PhD, Aalborg, Denmark (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

milda.dedelaite@gmail.com

TEACHING POINTS

To discuss the role, indications and limitations of different cross-sectional imaging modalities (CT, MRI/MRCP and secretin-MRCP) used to diagnose chronic pancreatitis. To discuss the role of endoscopic ultrasound as an additional diagnostic tool for diagnosing chronic pancreatitis. To review the diagnostic imaging algorithm for evaluation of patients with clinically suspected chronic pancreatitis or patients at risk of chronic pancreatitis.

TABLE OF CONTENTS/OUTLINE

- Definition of the chronic pancreatitis.- Indications for the abdominal CT scan in the investigation of chronic pancreatitis.- CT scan as the potential best initial/baseline examination.- Limitations of the CT scan in the diagnosis of chronic pancreatitis.- Indications of the MRI/MRCP in the investigation of chronic pancreatitis.- The role of the secretin-stimulated MRCP in the investigation and diagnosis of chronic pancreatitis.- Limitations of the MRCP in the diagnosis of chronic pancreatitis.- The role of the endoscopic ultrasound as an additional diagnostic tool for diagnosing chronic pancreatitis.- Overview of the diagnostic imaging algorithm for patients with clinically suspected chronic pancreatitis or patients at risk of chronic pancreatitis.

GI292-ED-MOB14 CEUS for Vascular Assessment of the Immediate Posttransplant Liver: When Doppler Fails

Station #14

Participants
Veronica Sue, MD, Portland, OR (*Presenter*) Nothing to Disclose
Kyle K. Jensen, MD, Portland, OR (*Abstract Co-Author*) Nothing to Disclose
Kristian Enestvedt, MD, Portland, OR (*Abstract Co-Author*) Nothing to Disclose
Erin Maynard, MD, Portland, OR (*Abstract Co-Author*) Nothing to Disclose
Roya Sohaey, MD, Portland, OR (*Abstract Co-Author*) Nothing to Disclose
Bryan R. Foster, MD, Portland, OR (*Abstract Co-Author*) Consultant , BotImage Inc

For information about this presentation, contact:

fosterbr@ohsu.edu

TEACHING POINTS

When Doppler fails to show normal flow in the transplant hepatic artery, CEUS is a safe, non-invasive imaging technique which reliably excludes thrombosis. CEUS generally shows the hepatic artery well, though requires some technologist and radiologist experience. CEUS is easy to perform at the bedside in the immediate postop period and plays a critical role in the decision making process for transplant surgeons.

TABLE OF CONTENTS/OUTLINE

Brief overview of liver transplant vascular complications. a. Types and rates of immediate complications. b. Anatomy of common and uncommon arterial reconstructions that may be encountered. Options for vascular imaging of the transplant liver. a. Focus on ease, accuracy and contraindications of each. b. Current CEUS literature and our own institutional data in brief. CEUS technique. a. Brief overview of general CEUS technique. b. In-depth technique specific to vascular assessment of the transplant liver. Case series presentation. a. Various arterial reconstruction appearance on CEUS b. Challenges in imaging the artery. c. Venous imaging and challenges. Proposed algorithm for vascular imaging escalation incorporating CEUS.

GI290-ED-MOB15 Peritoneal Metastasis, Cytoreductive Surgery (CRS), and Hyperthermic Intraperitoneal Chemotherapy (HIPEC): What the Radiologist Should Know

Station #15

Awards
Certificate of Merit

Participants
Pengcheng Zhang, MD, Winston-Salem, NC (*Abstract Co-Author*) Nothing to Disclose
James J. Perumpillichira, MD, Winston-Salem, NC (*Abstract Co-Author*) Nothing to Disclose
Brenda L. Holbert, MD, Winston Salem, NC (*Abstract Co-Author*) Nothing to Disclose
Lindsay Duy, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Raymond B. Dyer, MD, Winston Salem, NC (*Abstract Co-Author*) Nothing to Disclose
Scott C. Carter, MD, Albuquerque, NM (*Abstract Co-Author*) Nothing to Disclose
Neeraj Lalwani, MD, Winston Salem, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

nlalwani@wakehealth.edu

TEACHING POINTS

Selected patients with disseminated peritoneal metastasis may be treated with cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC), which has significantly improved long-term patient survival. Post procedure complications associated with peritoneal CRC/HIPEC are unique and may be directly related to resection of peritoneal metastases, the type of chemotherapy agent used, or to the HIPEC procedure itself. Radiologists should be aware of the therapeutic approach of CRC/HIPEC, it's potential for unique complications and their imaging appearance to avoid misinterpretation.

TABLE OF CONTENTS/OUTLINE

1. Introduction. 2. Peritoneal metastasis and surgical procedures: CRS and HIPEC. 3. Normal imaging findings after CRS/HIPEC procedures: peritoneal effusion, organ inflammation. 4. Complications and their imaging features. 5. Vascular abnormalities and miscellaneous. 6. Visceral complications: hepatobiliary, bowel, pancreatic, urinary bladder, diaphragmatic. 7. Abdominal wall complications. 8. Unfavorable sites of involvement. 9. Conclusion

GI293-ED-MOB16 Knowing and Recognizing the Complications of the Bile Duct After Liver Transplant: Normal Anatomy, Variants, and Complications

Station #16

Participants
Teresa A. Garcia, MD, Buenos Aires, Argentina (*Presenter*) Nothing to Disclose
Laura D. Mangiarotti, MD, Buenos Aires, Argentina (*Abstract Co-Author*) Nothing to Disclose
Marco Bonilha Zocatelli, MD, Capital Federal, Argentina (*Abstract Co-Author*) Nothing to Disclose
Julio R. Coronil, MD, Buenos Aires, Argentina (*Abstract Co-Author*) Nothing to Disclose
Stephanie Gross, MD, Buenos Aires, Argentina (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

agarcia@hbritanico.com.ar

TEACHING POINTS

To recognize possible biliary complications after liver transplant and the value of the existing classifications. To Highlight the relevance of early diagnosis of biliary complications of liver transplant. To Review various imaging methods that we can use and explain how to choose them, with emphasis in the use of cholangiopancreatography (MRCP).

TABLE OF CONTENTS/OUTLINE

1.Brief review of the the bile duct anatomy and the most frequent anatomical variants. 2.Recognize the anatomical variant S4 and its relevance. 3.Description of the most common performed anastomosis for liver transplant. 4.Current classification of biliary complications according to: -Time -Etiology -Location 5.Exhibit examples of our institution, considering that it is one of the largest liver transplant centers in Argentina

MSCA21

Case-based Review of the Abdomen (Interactive Session)

Monday, Dec. 2 1:30PM - 3:00PM Room: S100AB

GI GU

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Julie H. Song, MD, Sharon, MA (*Director*) Nothing to Disclose

For information about this presentation, contact:

Edward.Lee@childrens.harvard.edu

Sub-Events

MSCA21A Pediatric Abdomen

Participants
Pedro Daltro, MD, Rio de Janeiro, Brazil (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

daltro.pedro@gmail.com

MSCA21B Hepatobiliary Imaging

Participants
Khaled M. Elsayes, MD, Pearland, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

kmelsayes@mdanderson.org

LEARNING OBJECTIVES

1) Describe a spectrum of interesting hepatobiliary cases. 2) Discuss relevant technical background. pathophysiology and hemodynamics of these cases. 3) Correlate imaging features of these masses with clinical and pathologic findings. 4) Provide useful clues to reach a specific diagnosis.

Active Handout:Khaled M. Elsayes

http://abstract.rsna.org/uploads/2019/19000699/Active MSCA21B.pdf

MSCA21C Gastrointestinal Imaging

Participants
Elizabeth G. McFarland, MD, Lake Saint Louis, MO (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Evaluate GI clinical case review to classify cases into appropriate inflammatory to neoplastic etiologies. 2) Explain pertinent clinical information to increase awareness for appropriate patient management. 3) Define new updated colorectal cancer screening recommendations and how they apply to CT colonography.

MSCA21D Genitourinary Imaging

Participants
Frank H. Miller, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To interpret interesting genitourinary CT and MR cases to form a differential diagnosis to reach a definitive diagnosis. 2) To apply the teaching points from the individual challenging cases to future clinical cases seen in practice.

SPSP21

Contrastes y Trazadores: Estado del Art-Sesion del Colegio Interamericano de Radiologia (CIR) en Espanol/Contrast Agents and Radiopharmaceuticals: State of the Art-Session of Interamerican College of Radiology (CIR) in Spanish

Monday, Dec. 2 1:30PM - 3:30PM Room: E353C

CT GI MR NM SQ US

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.25

FDA Discussions may include off-label uses.

Participants
Jose L. Criales, MD, Huixquilucan, Mexico (*Moderator*) Nothing to Disclose
Jorge A. Soto, MD, Boston, MA (*Moderator*) Royalties, Reed Elsevier

For information about this presentation, contact:

jorge.soto@bmc.org

jcriales@att.net.mx

LEARNING OBJECTIVES

1) Conocer el uso actual, ventajas y desventajas de los medios de contraste en diferentes modalidades y en diversas situaciones clinicas. 2) Conocer los diversos trazadores, ademas de FDG, analizando su metabolismo normal y las indicaciones mas frecuentes. 1) Understand the current indications, benefits and limitations of the use of contrast agents for various imaging modalities. 2) Review the various types of radiotracers available today for PET Imaging, along with their normal metabolism and common indications for their use.

Sub-Events

SPSP21A Bienvenida/Welcome

Participants
Jose L. Criales, MD, Huixquilucan, Mexico (*Presenter*) Nothing to Disclose
Jorge A. Soto, MD, Boston, MA (*Presenter*) Royalties, Reed Elsevier

For information about this presentation, contact:

jorge.soto@bmc.org

SPSP21B Aplicaciones de Contraste en Ultrasonido/Use of Contrast Agents in Ultrasonography

Participants
Alison C. Harris, MBChB, Vancouver, BC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review the general principles and technique of using CEUS in the abdomen. 2) Discuss the role of CEUS in the diagnosis and characterization of masses in the liver and kidney. 3) Briefly discuss other applications of CEUS including guiding interventional procedures and monitoring of therapy.

ABSTRACT

Contrast-enhanced ultrasound (CEUS) continues to gain traction as a technique that complements traditional B-mode and Doppler ultrasound in the evaluation of the liver and other organs. Because the micro-vasculature can be visualized with CEUS and real-time imaging of tissue perfusion can be performed, imaging with this technique yields supplementary information, including flow and perfusion kinetics.The contrast agent used in CEUS is comprised of microbubbles, which are injected into a peripheral vein. The microbubble composition varies depending on the agent used, but the agent typically consists of an inert gas encased by a stabilizing shell composed of phospholipid, galactose, or albumin. The microbubbles circulate in the bloodstream and oscillate irregularly at low mechanical index settings within the acoustic field, creating nonlinear reflections that resonate at diagnostic ultrasound frequencies (3-5 MHz) and increase the signal produced.Proper technique and optimization of contrast-enhanced ultrasound require a balance between maintaining the integrity of the microbubble contrast agent and preserving the ultrasound signal. Established and emerging applications in the liver include diagnosis and characterization of focal lesions, aiding ultrasound-guided intervention, monitoring of therapy, and aiding surgical management.Read More: https://www.ajronline.org/doi/10.2214/AJR.17.17843Read More: https://www.ajronline.org/doi/10.2214/AJR.17.17843Read More: https://www.ajronline.org/doi/10.2214/AJR.17.17843

SPSP21C Uso de Agentes Organoespecificos en RM de Higado/Use of Organ-specific Agents in MR of the Liver

Participants
Claudio Bonini, MD, Rosario, Argentina (*Presenter*) Speaker, Bayer AG

For information about this presentation, contact:

clabonini@hotmail.com

ciabonini@hotmail.com

LEARNING OBJECTIVES

1) Medios de contraste hepatoespecíficos por MR. 2) Estructura molecular y su interacción a nivel celular. 3) Indicaciones actuales. 4) Ventajas y desventajas en comparación con los contrastes convencionales. 5) Contraindicaciones / 1) Hepatospecific contrast by MR. 2) Molecular structure and interaction at the cellular level. 3) Current indications. 4) Advantages and disadvantages compared to conventional contrasts. 5) Contraindications.

SPSP21D PET-CT: Radiotrazadores Mas Alla de FDG/PET-CT: Beyond FDG

Participants
Belen Rivera Bravo, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

brivera@unam.mx

LEARNING OBJECTIVES

1) Identify PET/CT radiopharmaceuticals other than FDG, used in clinical practice. 2) Describe the uptake mechanism of each radiopharmaceutical. 3) Differentiate the normal biodistribution of each radiopharmaceutical by reading the images of the study. 4) Recognize the clinical indication of each radiopharmaceutical based in the uptake mechanism. / 1) Al final de esta actividad, los participantes deberán ser capaces de. 2) Identificar radiofármacos de PET/CT diferentes al FDG utilizados en la práctica clínica. 3) Describir el mecanismo de concentración de cada radiofármaco. 4) Diferenciar la biodistribución habitual de cada radiofármaco al observar las imágenes del estudio. 5) Reconocer la indicación clínica de cada radiofármaco basado en su mecanismo concentración.

SPSP21E Preguntas/Q&A

SPSP21F Presentacion del CIR/CIR Update

Participants
Henrique Carrete Jr, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Present the Inter-American College of Radiology and its main educational activities. 2) Address the activities of the CIR throughout the year 2019. 3) Outline future directions of CIR.

SPSP21G Contraste Oral en TC: Nunca, Siempre O Algunas Veces?/Oral Contrast for Abdominal CT: Never, Always or Sometimes?

Participants
Antonio Jose B. Madureira, MD, Porto, Portugal (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the rationale for the use of oral contrast agents in CT examinations.2) To become familiar with the major indications of oral contrast use.3) To discuss the benefits and drawbacks of their use.

ABSTRACT

There has been a gradual decline in the last years in the use of oral contrast agents in CT examinations. In spite of these there are some clinical scenarios in which their use is of great benefit as it can clearly establish a diagnosis.In the emergency setting and in patients suspected of high-grade bowel obstruction their use is not warranted and may even be contraindicated.Oral contrast agents administration still has a role in CT imaging and every radiologist should be familiar with their indications and benefits in specific clinical situations.

SPSP21H Daño Renal Agudo por Contraste Iodado: Conceptos Actuales/Iodine Contrast Induced Acute Kidney Injury: Current Concepts

Participants
Cristian Varela, MD, Santiago, Chile (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

cvarelaubilla@gmail.com

LEARNING OBJECTIVES

1) Revisar la definición actual de daño renal agudo inducido por medio de contraste iodado/Review the current definition of contrast induced acute renal injury. 2) Conocer las características de los pacientes en riesgo/To know the characteristics of the high risk patients. 3) Definir las medidas de prevención basadas en la evidencia que el radiologo debe conocer y practicar/Define the evidence based prevention that the radiology need to know and apply.

SPSP21I Retencion de Gadolinio/Gadolinium Retention

Participants
Juan E. Gutierrez, MD, Medellin, Colombia (*Presenter*) Speakers Bureau, Bayer AG

For information about this presentation, contact:

juanes65@gmail.com

LEARNING OBJECTIVES

1) Define the classification of GBCAs based on molecular structure and other physicochemical properties. 2) Discuss current

literature regarding deposition of gadolinium in the brain (Clinical - Pre Clinical). 3) Describe the relationship between the type of contrast agents and gadolinium deposition in brain Describe FDA, ACR, and European Medicines Agency (EMA) guidelines for GBCA usage.

ABSTRACT

Gadolinium Based Contrast Agents (GCBA) had been part of MRI environment for three decades with great benefits on the development of imaging as well as helping radiologists to achieve a better knowledge of the human body and its diseases. So far more than 500 million injections of GCBA's have been applied Worldwide, initially and for many years GBBA's were believed to be a harmless solution, to the point of being used as contrast for DSA and also in double or triple dose for MRI, however, in 2006 evidence of Gadolinium retention in tissues was published proving its link with Nefrogenic Systemic Fibrosis (NSF) in renal impaired patients. This situation triggered multiple academic and regulatory evaluations, involving the pharma industry to define the risk benefit of using GBCA's depending on its safety profile, plus new warning regulations and classification for this agents issued by the FDA, EMA and ACR. New evidence of Gadolinium deposition in the brain, specifically locate at Dentate Nucleus and Globus Pallidus, after multiple GCBA's injections in patients with normal kidney function was recently published (2014), and gives again new evidence of the potential harmful effect of Gadolinium in tissues. This situation brought a new regulatory environment with different approach by the FDA and EMA, as well as a new challenge for the MRI practice worldwide.

SPSP21J **Preguntas/Q&A**

SPSP21K **Clausura/Closing**

Participants
Jose L. Criales, MD, Huixquilucan, Mexico (*Presenter*) Nothing to Disclose
Jorge A. Soto, MD, Boston, MA (*Presenter*) Royalties, Reed Elsevier

For information about this presentation, contact:

jorge.soto@bmc.org

Printed on: 10/29/20

SSE07

Gastrointestinal (Hepatobiliary)

Monday, Dec. 2 3:00PM - 4:00PM Room: S404CD

GI

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

FDA Discussions may include off-label uses.

Participants
Jason A. Pietryga, MD, Riverside, RI (*Moderator*) Consultant, Radiostics LLC
Jonathan R. Dillman, MD, MSc, Cincinnati, OH (*Moderator*) Research Grant, Siemens AG; Research Grant, Guerbet SA; Travel support, Koninklijke Philips NV; Research Grant, Canon Medical Systems Corporation; Research Grant, Bracco Group

Sub-Events

SSE07-01 Differential and Prognostic MRI Features of Gallbladder Neuroendocrine Tumors from Adenocarcinomas

Monday, Dec. 2 3:00PM - 3:10PM Room: S404CD

Participants
Jae Seok Bae, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Se Hyung Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jeongin Yoo, Seoul, 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 identify MRI features that are helpful for the differentiation between gallbladder (GB) neuroendocrine tumors (NETs) and adenocarcinomas (ADCs) and to evaluate their prognostic values.

METHOD AND MATERIALS

Between January 2010 and November 2018, we recruited 63 patients with GB NETs (n=21) and ADCs (n=42) who underwent MRI. Two radiologists independently assessed MRI findings and reached a consensus. Univariate and multivariate analyses were performed to identify significant differential MRI features of GB NETs from ADCs. Cox proportional hazard model was used to find prognostic MRI findings for overall survival (OS).

RESULTS

Compared to ADCs, NETs more frequently demonstrated the following MR features: well-defined margin, intact overlying mucosa, targetoid enhancement on contrast-enhanced images, and targetoid appearance on diffusion-weighted imaging (DWI) (Ps<0.001 for all). In addition, liver metastasis was more common (P<0.001) and had more conspicuous border (P=0.045). Lymph node (LN) metastasis tended to show higher N stage (P=0.006) and targetoid appearance on DWI (P=0.001). On quantitative analysis, the sizes of GB mass and metastatic LN in NETs was significantly larger than those of GB ADCs (P=0.003 and P=0.022, respectively). Median and mean follow-up periods were 16.0 months (range, 1-62 months) and 21.6 ± 17.6 months, respectively. GB NETs showed a significantly worse OS compared to ADCs (median OS, 12.0 months versus 44.0 months, P=0.005). Multivariate Cox regression analysis revealed that the presence of liver metastasis (hazard ratio (HR) 10.683, 95% confidence interval [CI]: 1.551-73.587) and a larger size of metastatic LN (HR 2.004, 95% CI: 1.189-3.377) were poor prognostic factors for OS.

CONCLUSION

There are several differential MR features of GB NETs from ADCs. GB NETs showed a significantly worse OS compared to GB ADCs and the presence of liver metastasis and a larger size of metastatic LN were associated with poor OS.

CLINICAL RELEVANCE/APPLICATION

Contrast-enhanced MRI including diffusion-weighted imaging could be helpful for the differentiation of GB NETs from GB ADCs as well as for the prediction of patients' prognosis.

SSE07-02 Spleen and Liver Volumetry in Primary Sclerosing Cholangitis: Comparison to MELD Score in Predicting Liver Function

Monday, Dec. 2 3:10PM - 3:20PM Room: S404CD

Participants
Pegah Khoshpouri, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Roya Rezvani Habibabadi, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Sanaz Ameli, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose

Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Amy Kim, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

pkhoshp1@jhmi.edu

PURPOSE

To determine if liver and spleen volumes can predict liver dysfunction as defined by encephalopathy, variceal bleeding, Hepatorenal syndrome, and liver-related death in PSC patients and to compare the value of these volumes to MELD in predicting outcome.

METHOD AND MATERIALS

This IRB-approved, retrospective single center study included 166 PSC patients with at least one liver imaging study (MR/CT) between 2000 and 2018. Total liver(T), right(R) and left(L) lobes, caudate(C) and spleen(S) volumes were measured. The volumetric parameters were compared between patients with and without liver dysfunction, which was an adverse outcome, using Mann-Whitney U test. Spearman's test was performed to correlate the volumes to MELD. We used ROC analysis to test the accuracy of volumetric parameters to predict developing an adverse outcome and multiple logistic regression to find its independent predictors. Pvalue<0.05 was considered statistically significant.

RESULTS

Our cohort included 97 (58%) males with mean age of 43, with no significant differences in age between patients with and without liver dysfunction. Among 166 patients,35% didn't have adverse outcome,14% were dead and 37%,26%, and 3%, ended up with variceal bleeding, encephalopathy, and/or Hepatorenal syndrome, respectively. Patients with and without adverse outcome had significantly different absolute and ratio volumetry of S, L, and C ($p<0.05$). S, S/R, and ST/RR (n=155; 11 patients had splenectomy) with AUC of 0.729, 0.744, and 0.738, respectively, to differentiate patients with and without adverse outcome, correlated significantly with MELD with AUC of 0.714 (rho was 0.52, 0.53, and 0.53, respectively; $p<0.001$). S, L, C, L/T, C/T, S/T, S/L, S/R, ST/L2, ST/RR were potential predictors of adverse outcome in unadjusted univariate logistic model ($p<0.05$). In final adjusted model, ST/RR showed superior predictive value (OR=1.56; p=0.041) over MELD (OR=1.10; p=0.003).

CONCLUSION

Liver and spleen volumetric parameters could predict liver dysfunction in PSC. Using the volumes of T, R, and S could potentially improve the predictive value of MELD.

CLINICAL RELEVANCE/APPLICATION

MELD may fluctuate in patients with PSC due to recurrent cholangitis episodes. Increased MELD may result in un-necessary transplant workup, since it could be transient. Liver and spleen volumetry are less susceptible to transient fluctuations and may be better predictors for the need for liver transplantation.

SSE07-03 Balanced Steady-State Free Precession MRCP is a Robust Alternative to Respiration-Navigated 3D Turbo-Spin-Echo MRCP

Monday, Dec. 2 3:20PM - 3:30PM Room: S404CD

Participants
Felix C. Hasse, Heidelberg, Germany (*Presenter*) Nothing to Disclose
Buket Selmi-Ozer, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Hamed Albusaidi, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Christian Rupp, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Hans-Ulrich Kauczor, MD, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose
Tim Weber, MD, Heidelberg, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Despite synchronization to respiration, respiration-navigated (RN) 3D turbo-spin-echo MRCP is limited by susceptibility to motion artifacts. Aim of this study was to assess the quality of pancreaticobiliary duct visualization of a non-RN MRCP alternative based on balanced steady-state free precession imaging (BSSFP) with overlapping slices compared with RN-MRCP.

METHOD AND MATERIALS

This is a prospective study on 50 consecutive patients receiving MRCP at 1.5T without final diagnosis of pancreaticobiliary duct disease. We performed an intraindividual comparison of coronal RN-MRCP (thickness, 1.5 mm; interval, 1.5 mm) with combined coronal (thickness, 4 mm; interval, 1.6 mm) and transverse (thickness, 6 mm, interval, 2.4 mm) BSSFP-MRCP. Image quality was scored by 3 readers for 6 pancreaticobiliary duct segments (3 pancreatic, 3 biliary) using a 6-point scale (1, not completely depicted, 6, entirely depicted with excellent details). A segment score of 3 or lower as assessed by at least 2 of 3 readers was defined to indicate insufficient segment visualization. Wilcoxon nonparametric tests and assessment of interrater agreement were used for statistical analysis.

RESULTS

Overall duct visualization averaged over all readers was scored with 4.5±1.1 for RN-MRCP (pancreatic, 4.1±0.5; biliary, 5.0±0.4) and 4.9±0.9 for combined coronal and transverse BSSFP-MRCP (pancreatic, 4.6±0.6; biliary, 5.1±0.6), respectively ($p<0.001$). The number of segments visualized insufficiently was 48/300 for RN-MRCP and 11/300 for BSSFP-MRCP ($p<0.001$). Segments visualized insufficiently in RN-MRCP had a mean score of 4.4±0.8 in BSSFP-MRCP. The segment most frequently visualized insufficiently was the pancreatic tail for both RN-MRCP and BSSFP-MRCP. Overall interrater agreement on sufficiency of duct visualization was 0.78 (RN-MRCP, 0.85; BSSFP-MRCP, 0.71). Mean acquisition time was 98% longer for RN-MRCP (198.0±98.7s) than for combined coronal and transverse BSSFP-MRCP (100.2±0.4s).

CONCLUSION

Non-RN BSSFP-MRCP with overlapping slices is a fast alternative to RN-MRCP frequently providing sufficient duct visualization when

RN-MRCP fails.

CLINICAL RELEVANCE/APPLICATION

As an option for patients with poor breathing compliance, pancreaticobiliary duct visualization can be improved with BSSFP-MRCP in 51% of the acquisition time of RN-MRCP.

SSE07-04 MRI in Primary Sclerosing Cholangitis: Retrospective Review in Understanding the Evolution and Related Complications

Monday, Dec. 2 3:30PM - 3:40PM Room: S404CD

Participants
Anirudh V. Nair, MBBS, Ottawa, ON (*Presenter*) Nothing to Disclose
Blair MacDonald, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

dranirudhnair@gmail.com

PURPOSE

To study the incidence of PSC precipitated malignancy. To study the spectrum of MR imaging features in patients with primary sclerosing cholangitis and the incidence of related complications.

METHOD AND MATERIALS

Retrospective analysis of 350 patients with known PSC in whom routine and targeted screening with MRI liver done in our institution in the past 15 years was included in the study. Two abdominal radiologist retrospectively reviewed MR images in consensus. Imaging findings on bile ducts, dominant strictures, pattern of involvement of intra/extra hepatic bile ducts, hepatic fibrosis, changes in liver morphology, varices, gall bladder abnormalities, cholangitis was studied. The incidence of PSC preciptated malignancies was ascertained.

RESULTS

The incidence of dominant stricture was 11.4% (40 cases), in whom the biopsy did not reveal any underlying malignancy. Incidence of overlap syndrome was 0.8 %, while there was background cirrhosis in 8.5% ;hepatic parenchymal fibrosis in 4.2% cases; large varices in 2.8% ; and there was associated infective exacerbation due to cholangitis in 2.2% of cases. The incidence of cholangiocarcinoma was 1.4% (5 cases), non-hodgkins lymphoma was 0.8% (3 cases), gall bladder carcinoma in 0.2% (1 case). The frequency of screening and resource allocation in performing a follow up MRI had an average interval period of 14 months.

CONCLUSION

Understanding spectrum of imaging findings and related complications is important for progressing further clinical management in cases related to PSC. Although there is no sufficient guidelines recommending the time interval of MRI liver follow up that is required, an annual follow up irrespective of clinical or biochemical worsening is useful in ascertaining the temporal evolution of the disease.

CLINICAL RELEVANCE/APPLICATION

(dealing with PSC) ' MRI liver with MRCP is an excellent tool to depict the temporal evolution of PSC and related complications "

SSE07-05 Prediction of Tumor Recurrence and Poor Survival after Surgery of Ampullary Adenocarcinoma Using Preoperative CT Imaging, Clinical, and Histopathological Findings

Monday, Dec. 2 3:40PM - 3:50PM Room: S404CD

Participants
Heera Yoen, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Jung Hoon Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Bo Yun Hur, Goyang, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Su Joa Ahn, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sun Kyung Jeon, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Joon Koo Han, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

zelkova0712@gmail.com

PURPOSE

To predict tumor recurrence and poor survival in patients who underwent surgery for ampullary adenocarcinoma using preoperative CT imaging, clinical, and histopathological findings.

METHOD AND MATERIALS

In this retrospective study, 230 patients with ampullary adenocarcinoma who underwent preoperative CT and surgery were included. CT findings were assessed by two radiologists. Clinical characteristics and histopathological results such as CA19-9, CEA, T-, N-stage, histologic phenotypes; intestinal or non-intestinal (pancreatobiliary or mixed type), and resection status were investigated. Cox proportional hazard model and Kaplan-Meier method with log-rank test were used to find prognostic factors for recurrence free survival (RFS) and overall survival (OS). Also optimal cutoff value of tumor size was evaluated for oncologic outcomes and validated with internal cross validation

RESULTS

Median OS was 61.8 ± 37.4 and RFS was 54.3 ± 40.7 months. Tumor size on CT (odds ratio (OR) 1.045, 95% CI: 1.015-1.076, p=0.003), N-stage (OR 1.979, 95% CI: 1.271-3.081, p=0.003) and histologic differentiation (OR 2.437, 95% CI: 1.025-2.437 for

well-differentiated compared with moderate differentiation; OR 5.536, 95% CI 2.033-15.078 for moderate differentiation compared with poor differentiation, p<0.05) were important predictors of early recurrence. For poor survival, tumor size (OR 1.030, 95% CI: 1.001-1.061, p=0.042), papillary bulging (OR 0.633, 95% CI: 0.400-0.999, p=0.05), organ invasion (OR 1.855, 95% CI: 1.012-3.401, p=0.046) on CT scans, and N-stage (OR 2.808, 95% CI: 1.771-4.453, p<0.001) were important predictors of poor OS. Especially for tumor size, 2.65cm and 3.15cm were significant cutoff value for poor OS and RFS and it was validated internal cross validation (P<0.001). For tumor exceeding this cutoff value, median survival time were 22.5 months for OS and 8.4 months for RFS.

CONCLUSION

Both preoperative CT findings and histopathological results are useful to predict oncologic outcomes. Especially preoperative CT findings including tumor size, papillary bulging, and organ invasion were important for prediction early recurrence and poor survival.

CLINICAL RELEVANCE/APPLICATION

Combination of preoperative CT findings and histopathological results can be useful to predict patients' prognosis after surgery for ampullary adenocarcinoma. Especially for tumor size on CT, 2.65cm and 3.15cm were significant cutoff value for poor OS and RFS.

SSE07-06 CT Findings and Outcomes of Acute Cholecystitis: Is Additional Imaging Necessary?

Monday, Dec. 2 3:50PM - 4:00PM Room: S404CD

Participants
Daniel Lee, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Linda W. Nunes, MD,MPH, Plymouth Mtng, PA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

daniel.lee3@pennmedicine.upenn.edu

PURPOSE

To evaluate the positive predictive value of CT for diagnosing acute cholecystitis when used as a first line imaging evaluation for working up abdominal pain and to assess if additional imaging with ultrasound studies add value to the diagnosis.

METHOD AND MATERIALS

CT imaging studies were evaluated in a retrospective study within a large US health system, which combines multiple academic centers with community centers. Final CT reports over a 25-month period were queried for abnormal gallbladder findings. Other relevant modalities performed within 24 hours of the initial CT were also included. Cases were tracked by chart review, and the clinical outcomes in each case were compiled to establish a final outcome or diagnosis. Surgical pathology or abnormal fluid aspirate analyses were treated as positive. Cases were stratified by the radiologist confidence level of each CT, and the positive and negative predictive values (PPVs and NPVs) were compared between different combinations of each modality.

RESULTS

Of the 468 CT imaging studies meeting criteria, 192 were read as probable or highly probable for acute cholecystitis on CT. The PPV for acute cholecystitis was 48% when no ultrasound was performed, compared to 57% when ultrasound was performed, which amounted to an insignificant gain (P = 0.1936). When subdivided into confidence levels, high confidence positive CTs demonstrated no significant change without ultrasound (67%) compared to ultrasound (65% in 'highly probable' impressions, 71% in 'probable' impressions). CT reads lower than 'highly probable' demonstrated potential gain from ultrasound; in the case of a 'probable' CT impression, PPV increased from 39% without ultrasound to 70% in the setting of a 'highly probable' ultrasound impression. In CT impressions negative for acute cholecystitis, there was no significant additive negative predictive value to ultrasound.

CONCLUSION

Based on current clinical practices within a large health system, CT examinations with either high or low suspicion for acute cholecystitis demonstrated no significant diagnostic gain from additional imaging with ultrasound. However, additional imaging may be of benefit when CT interpretations are less definitive but still suspicious for acute cholecystitis.

CLINICAL RELEVANCE/APPLICATION

This study identifies subclasses of CT interpretations regarding acute cholecystitis that would predict no additional diagnostic benefit from ultrasound imaging.

SSE08

Gastrointestinal (Esophagus and Stomach)

Monday, Dec. 2 3:00PM - 4:00PM Room: S404AB

CT GI

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

FDA Discussions may include off-label uses.

Participants
Erik Soloff, MD, Seattle, WA (*Moderator*) Research Grant, General Electric Company
David J. Disantis, MD, Jacksonville, FL (*Moderator*) Nothing to Disclose

Sub-Events

SSE08-01 Radiogenomics for Epigenomic Data: Estimated Serum MicroRNA-1246 From Contrast-Enhanced CT Can Predict Prognosis of Esophageal Squamous-Cell Carcinoma

Monday, Dec. 2 3:00PM - 3:10PM Room: S404AB

Participants
Hajime Yokota, MD, Chiba, Japan (*Presenter*) Nothing to Disclose
Isamu Hoshino, Chiba, Japan (*Abstract Co-Author*) Nothing to Disclose
Yosuke Iwadate, Chiba, Japan (*Abstract Co-Author*) Nothing to Disclose
Takashi Uno, Chiba, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

hjmykt@chiba-u.jp

PURPOSE

Radiogenomics is a new field that provides clinically useful predictions of prognosis by linking the molecular characteristics such as genetic aberrations of malignant tumors with medical images. On the other hand, abnormal expression of serum microRNA has been reported as a prognostic factor of malignant and is thought to be a new biomarker. Using the technique of radiogenomics, we attempted to infer the degree of expression of microRNA in the serum of esophageal squamous-cell carcinoma (ESCC) patients.

METHOD AND MATERIALS

Serum miR-1246 expressions in 92 ESCC patients were evaluated by qRT-PCR. A radiologist delineated the volume of interest (VOI) within each tumor region on contrast-enhanced CT images. Using morphology, histogram and texture analyses, 45 imaging features (IF) in the VOIs were extracted. Features were selected according to correlation analysis between miR-1246 and each IF. A prediction model for miR-1246 was constructed using linear regression of selected feature with 10-fold cross-validation. A threshold of miR-1246 dividing into high and low expression groups was defined with ROC analysis. Survival analyses were performed using the log-rank test and Cox regression.

RESULTS

SHAPE_Compacity and NGLDM_Coarseness were selected as IF correlated with the expression of miR-1246 (real_miR-1246) ($r = 0.29$ and 0.30; $p = 0.004$ and 0.003) and were used to construct a prediction model. When applying the calculated threshold of Real_miR-1246 (=15.0) for the estimated miR-1246 expression (est_miR-1246), there was a significant difference between high and low expression groups ($p=0.003$) as well as real_miR-1246 ($p=0.001$). Real_miR-1246 was an independent predictor for overall survival on the multivariate test, whereas est_miR-1246 was also the same.

CONCLUSION

The close relation between expression levels of miR-1246 and IF such as SHAPE_Compacity and NGLDM_Coarseness were observed. Est_miR-1246 had similar power to predict prognosis of ESCC.

CLINICAL RELEVANCE/APPLICATION

Radiogenomic can predict genomic/epigenomic data strongly related to prognosis with low cost. This approach might proceed to accomplish precision medicine.

SSE08-02 Esophageal Cancer: Dual-Energy Spectral CT Quantitative Parameters for Preoperative Diagnosis of Metastatic Lymph Nodes

Monday, Dec. 2 3:10PM - 3:20PM Room: S404AB

Participants
Jian Zhou, Guangzhou, China (*Presenter*) Nothing to Disclose
Shuiqing Zhou, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Kongjia Luo, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Ni He, PhD, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Jietian Jin, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose

Lizhi Liu, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Zhesheng Wen, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Chuanmiao Xie I, MD,PhD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

zhoujian@sysucc.org.cn

PURPOSE

To evaluate the diagnostic performance of quantitative parameters derived from dual-energy CT for the preoperative diagnosis of metastatic lymph nodes in participants with esophageal cancer.

METHOD AND MATERIALS

For this prospective study, dual-phase contrast agent-enhanced CT was performed in participants with esophageal cancer from June 2016 to May 2018. Quantitative dual-energy CT parameters were compared between metastatic and non-metastatic lymph nodes. The optimal cutoff value of metastatic node was determined using the receiver operating characteristic (ROC) curve analysis.

RESULTS

This study included 99 participants. A total of 51 lymph nodes were diagnosed as metastatic lymph nodes, and 45 lymph nodes were diagnosed as non-metastatic lymph nodes. Quantitative dual-energy CT parameters including iodine concentration (IC), normalized iodine concentration (ICN), slope of the spectral Hounsfield unit curve (λHu), normalized slope of the spectral Hounsfield unit curve (λHu-N) measured at venous phase were higher in metastatic than in non-metastatic lymph nodes ($P < 0.01$). The combined diagnosis was the best predictor of metastatic lymph nodes, with a threshold of 0.558, thus demonstrating 88.2% sensitivity, 93.2% specificity, and 90.5% accuracy ($P < 0.001$), with the area under ROC curve of 0.943.

CONCLUSION

Dual-energy CT is a complementary means for the preoperative identification of lymph nodes metastases in participants with esophageal cancer.

CLINICAL RELEVANCE/APPLICATION

Dual-energy CT could be used for the preoperative identification of lymph nodes metastases in participants with esophageal cancer.

SSE08-03 Real-Time MRI for Assessment of Gastroesophageal Reflux Disease: Comparison to pH-Metry and Impedance

Monday, Dec. 2 3:20PM - 3:30PM Room: S404AB

Participants
Lorenz Biggemann, Goettingen, Germany (*Presenter*) Nothing to Disclose
Johannes Uhlig, Goettingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Ulrike Streit, MD, Goettingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Dirk Voit, Goettingen, Germany (*Abstract Co-Author*) Research collaboration, Siemens AG
Martin Uecker, Goettingen, Germany (*Abstract Co-Author*) Research collaboration, Siemens AG
Jens Frahm, PhD, Goettingen, Germany (*Abstract Co-Author*) Inventor, Real-Time MRI Method
Joachim Lotz, MD, Gottingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Ali Seif Amir Hosseini, MD, Goettingen, Germany (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

lorenz.biggemann@med.uni-goettingen.de

PURPOSE

To evaluate the diagnostic potential of real-time MRI for assessment of gastroesophageal reflux disease in patients with GERD-like symptoms compared to pH-metry and impedance.

METHOD AND MATERIALS

Patients who underwent real-time MRI and pH-metry between 2015-2018 were included in this study. Real-time MRI at 3 Tesla was achieved by highly undersampled radial FLASH acquisitions with iterative image reconstruction by regularized nonlinear inversion. Real-time MRI visualized transit of pineapple juice through the gastroesophageal junction at rest and during Valsalva maneuver. MRI results were compared to 24-hour pH-metry to assess acid reflux (following Lyon Consensus guidelines), as well as to impedance to assess non-acid reflux. A standard 2x2 table was chosen to calculate diagnostic performance measures.

RESULTS

Of 93 eligible patients, 91 patients with GERD-like symptoms fulfilled inclusion criteria (male n=49; female n= 42; median age 55y). One patient was excluded due to pH-metry probe defect and one due to diagnosis of achalasia on real-time MRI. All MRI studies were successfully completed without adverse events at a median examination time of 15 minutes. Using real-time MRI, reflux was detected in 60 patients (66%). pH-metry revealed reflux in 41 patients (45%), and impedance in 54 patients (59%). Compared to pH-metry as reference, real-time MRI demonstrated sensitivity 0.82 (0.67, 0.93), specificity 0.47 (0.33, 0.62) and PPV 0.55 (0.42, 0.68). Due to the high number of false positive readings in this setting, a second scenario with assessment of acid as well as non-acid reflux was considered. Here, the reference standard was either positive reflux on pH-metry (indicating acid reflux) or a high number of reflux episodes during impedance (indicating non-acid reflux). In this scenario, real-time MRI sensitivity was 0.78 (0.66, 0.87), specificity 0.67 (0.45, 0.84) and PPV 0.87 (0.75, 0.94).

CONCLUSION

Real-time MRI is a fast and safe imaging method for assessment of gastroesophageal reflux in patients with GERD-like symptoms. Considering its high positive predictive value, real-time MRI can accurately identify patients in which further invasive testing with pH-metry and impedance might be considered.

CLINICAL RELEVANCE/APPLICATION

Real-time MRI is a novel imaging technique that allows for assessment of reflux in patients with GERD-like symptoms, showing a good correlation with established pH-metry and impedance measurement.

SSE08-04 Stratification of Gastrointestinal Stromal Tumors: Evaluation of Data Mining and Radiomics Features

Monday, Dec. 2 3:30PM - 3:40PM Room: S404AB

Participants
Isabella Martini, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Marco Rengo, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Stefano Badia, Latina, Italy (*Abstract Co-Author*) Nothing to Disclose
Simona Picchia, MD, Lazio, Italy (*Abstract Co-Author*) Nothing to Disclose
Elsa Iannicelli, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Andrea Laghi, MD, Rome, Italy (*Abstract Co-Author*) Speaker, General Electric Company; Speaker, Guerbet SA; Speaker, Bayer AG; Speaker, Bracco Group; Speaker, Merck & Co, Inc
Federica Landolfi, MD, Rome, Italy (*Presenter*) Nothing to Disclose

PURPOSE

To develop and validate a decision tree model, based on texture features extracted from contrast enhanced multi detector computed tomography (MDCT), to discriminate between high and low risk gastrointestinal stromal tumors (GISTs) according to Miettinen's classification

METHOD AND MATERIALS

A population of 53 patients with proven GIST and subjected to MDCT of the abdomen were selected. All patients underwent surgical resection and histopathology was the gold standard. 30 texture features were extracted from MDCT images and 8 morphological features were identified by two expert radiologists. The population was split in two cohorts, one for training (32 patients) and one for validation (21 patients) of a random forest (RF) classifier. The training model was obtained after 100 iterations. All patients were stratified as higher risk (Miettinen's class moderate and high risk) or lower risk (Miettinen's class no risk, very low risk and low risk).

RESULTS

The model based on RF classifier algorithm correctly classified 16 (80%) patients (validation cohort) with a mean absolute error of 0.34%. The AUC for the identification of higher risk patients was 0.845 while for lower risk was 0.815. True positive rate was 80% while false positive rate was 20% for both classes (Higher and lower risk).

CONCLUSION

The RF model developed using texture and morphological features, obtained from MDCT images, provided a high accuracy (80%) for the identification of higher and lower risk patients according to Miettinen's classification. This approach can be considered as a potential tool for the non invasive staging of GISTs.

CLINICAL RELEVANCE/APPLICATION

Texture analysis and morphological computed tomograpy features can be considered as a potential tools for the non invasive staging of GISTs

SSE08-05 Noninvasive Evaluation of Esophageal Varices with Spleen Hemodynamics in Cirrhotic Patients: A Dual-Energy CT Study

Monday, Dec. 2 3:40PM - 3:50PM Room: S404AB

Participants
Liqin Zhao, MD, Beijing, China (*Presenter*) Nothing to Disclose
Xinjun Han, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Qiuting Cao, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Shufan Shang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

zhaolq0129@163.com

PURPOSE

To evaluate noninvasively the degree of esophageal varices in cirrhotic portal hypertension patients with spleen hemodynamic parameters obtained using dual energy CT.

METHOD AND MATERIALS

Fifty patients with portal hypertension due to cirrhosis were retrospectively selected. These patients all had esophageal varices (EV) confirmed by endoscopy. Fifteen liver transplant donors were selected retrospectively as the control group. All patients underwent contrast-enhanced dual energy CT (DECT) scans. The iodine content in spleen (IC-S) in the portal venous phase, the splenic volume (Vol-S), and the diameters of splenic vein (D-SV) were obtained by two experienced radiologists on a DECT post-processing workstation and the iodine volume of spleen (IV-S) was calculated using the following formula: IV-S=IC-S×Vol-S. EV was classified into three groups according the results of endoscopy. The degree of Spearman correlation analysis was used to analyze the correlation between the EV degree and the above parameters. ANOVA was used to compare the differences of the above parameters among different EV groups. The ROC curve was used to analyze the diagnostic efficiency of the correlated parameters. $P<0.05$ was considered statistically significant.

RESULTS

There were positive correlations between the EV degree and Vol-S, D-SV, and IV-S , with the correlation coefficient between EV degree and IV-S the highest ($R=0.627$, $P<0.05$) among the three spectral CT parameters. The differences of the Vol-S, D-SV and

IV-S among different EV degree groups were statistically significant (all P<0.05). The ROC analysis showed that the area under the curve (AUC) with Vol-S, D-SV and IV-S were large. The diagnostic sensitivity and specificity were high using these parameters. The diagnostic specificity of using Vol-S was 96%.

CONCLUSION

The parameters, Vol-S, D-SV and IV-S, obtained in DECT, could be used to evaluate the severity of EV noninvasively.

CLINICAL RELEVANCE/APPLICATION

DECT parameters can be used to indicate the EV degree, predict the esophageal varices bleeding and learn the visceral hemodynamics.

SSE08-06 Is Surveillance CT or Ultrasound Necessary for the Detection of Extragastric Recurrence After Curative Surgery for Early Gastric Carcinoma?

Monday, Dec. 2 3:50PM - 4:00PM Room: S404AB

Participants
Jae Seok Bae, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Se Hyung Kim, MD, Seoul, 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 evaluate the yield of follow-up abdomen CT and ultrasound (US) for the detection of extragastric recurrence after curative surgery for early gastric cancers (EGCs).

METHOD AND MATERIALS

In this single-institutional retrospective study, we enrolled 407 patients who underwent radical surgery for EGCs between January and December 2010 and who underwent post-operative surveillance with CT, US, and/or gastroscopy. All patients were followed up until February 2019. The primary outcome was post-operative CT or US detection of extragastric recurrence (i.e., distant or lymph node metastasis) which was not discovered with endoscopy. The secondary outcome was CT and/or endoscopic detection of gastric recurrence.

RESULTS

Mean and median follow-up periods were 64.1 ± 28.1 months and 66.0 months (range, 0-106 months), respectively. From a total of 3808 post-operative CT (2351 examinations) and US (1457 examinations), extragastric recurrence was detected only in two patients, with an incidence of 0.5% (2/407). One patient had extragastric recurrence at duodenal stump which was detected on CT at 23 months after subtotal gastrectomy for EGC (pT1bN0, poorly differentiated). The other patient had liver metastasis which was detected on CT at 10 months after subtotal gastrectomy for EGC (pT1bN0, moderately differentiated). There was no gastric recurrence detected with post-operative CT or US examinations. From a total of 1901 post-operative endoscopic examinations, two gastric recurrences were detected. These two gastric recurrences were detected at 18 and 61 months after subtotal gastrectomy, respectively. One gastric recurrence developed remote to the anastomosis site and the other recurred tumor was detected around the anastomosis site. Both gastric recurred lesions showed identical histologic types to those of the initial tumors.

CONCLUSION

Extragastric recurrence after curative surgery for EGC was very rare (0.5%, 2/407), but exclusively developed in patients with pT1b cancers. Therefore, post-operative surveillance with CT or US should be selectively performed in patients with a higher risk of recurrence.

CLINICAL RELEVANCE/APPLICATION

Considering a radiation risk and cost-effectiveness, post-operative surveillance with CT or US in patients who received gastrectomy for EGCs should be selectively performed in patients with a higher risk of recurrence.

SSE09

Gastrointestinal (Artificial Intelligence and Machine Learning)

Monday, Dec. 2 3:00PM - 4:00PM Room: N230B

AI CT GI

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

FDA Discussions may include off-label uses.

Participants
Bhavik N. Patel, MD, Fremont, CA (*Moderator*) Speakers Bureau, General Electric Company; Research Grant, General Electric Company
Michael S. Gee, MD, PhD, Boston, MA (*Moderator*) Nothing to Disclose

Sub-Events

SSE09-01 A Machine Learning Pipeline for Automatic Multi-Site-Vendor Quantitative MRI Analysis of the Liver

Monday, Dec. 2 3:00PM - 3:10PM Room: N230B

Participants
Benjamin J. Irving, PhD, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd
Alexandre Triay Bagur, MSc, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd ; Stockholder, Perspectum Diagnostics Ltd
Darryl McClymont, PhD, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd
Andrea Dennis, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd
John McGonigle, BSC,PhD, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd
Marion D. Maguire, BSC, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd
Matt Kelly, PhD, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd
Michael Brady, Oxford, United Kingdom (*Presenter*) Founder and Chairman, Perspectum Diagnostics Ltd Founder and Chairman, Volpara Health Technologies Limited Founder, ScreenPoint Medical BV Chairman, Acuitas Medical Ltd Chairman, IRISS Medical Chairman, Colwiz

PURPOSE

Quantitative MRI of the liver based on corrected T1, T2* and PDFF enables characterisation of liver state by providing information about fibro-inflammation, iron, and liver fat. This is often difficult and time-consuming challenge to the Radiologist, not least because heterogeneous disease and artefacts such as motion and field inhomogeneities. With of non-alcoholic fatty liver disease, this is increasingly more important, and in order to achieve a high throughput we have developed a machine learning pipeline to generate and automatically analyse quantitative MRI scans of the liver.

METHOD AND MATERIALS

We acquired 1347 MRI scans from 15 sites world-wide, including all major vendors at both 1.5T and 3T. All of the images were processed manually by trained clinical analysts who both performed manual delineation of the liver and selected regions of interest (ROIs) to quantify liver T1, T2* and PDFF. Using these manually generated segmentation masks, we trained a U-Net based deep learning method to automatically delineate the liver. Regions that exhibited poor model fit and artefacts in the MRI image were automatically identified and excluded. Next, in order to mimic ROI analysis performed manually, the unsupervised mask-SLIC algorithm with a trained classifier was used to define and detect the best regions based on quality metrics. In each case, the automatically calculated T2* value for the liver was used to produce an iron corrected T1 (cT1) map. Finally, a triaging step is used to identify low confidence cases for closer manual review.

RESULTS

The manually-placed ROIs were compared to those placed automatically. The difference between manual and automatic was -0.02+/-4.8 ms (T2*), 0.0+/-63 ms (cT1) and -0.1+/-1.9 % (PDFF). By automatically detecting poorer cases with triaging, the CI is reduced to -0.3+/-3.0 ms (T2*), -5.8+/- 30.1 ms (cT1) and -0.2+/-1.1 % (PDFF). These results were similar to the inter-rater variability measured in a smaller trial (-0.6+/-2.12 ms (T2*), 3.68+/-41.3 ms (cT1) and 0.48+/-1.77 % (PDFF)).

CONCLUSION

The automatic processing pipeline (based on machine learning) yields results that compare closely to those generated by manual processing.

CLINICAL RELEVANCE/APPLICATION

Automated analysis of quantitative maps has the potential to hugely increase the efficiency of evaluating challenging quantitative results, and to increase the viability of quantitative MRI analysis in standard clinical workflows.

SSE09-02 Development and Validation of a Deep Learning-Based Algorithm for Detecting Malignant Hepatic Lesions on Multi-Phase CT in Patients at High Risk for Hepatocellular Carcinoma

Monday, Dec. 2 3:10PM - 3:20PM Room: N230B

Participants
Dong Wook Kim, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Gaeun Lee, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
So Yeon Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Geunhwi Ahn, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
June-Goo Lee, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seung Soo Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Kyung Won Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seong Ho Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Research Grant, Central Medical Service Co, Ltd
Yoon Jin Lee, MD, Seongnam, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Namkug Kim, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Stockholder, Coreline Soft, Co Ltd; Stockholder, Anymedi, Inc

PURPOSE

To develop and validate a deep-learning model for automatic detection of malignant hepatic lesions on multi-phase CT in patients at high risk for hepatocellular carcinoma (HCC).

METHOD AND MATERIALS

In this retrospective study, 1350 multi-phase CT image series including pre-, arterial-, portal-, and delayed-phases in 1320 patients at high risk for HCC (1054 men and 296 women; mean age, 56.76 years; age range, 20-87 years) obtained between 2007 and 2016 were included. Focal hepatic lesions were labeled and annotated by five board-certified radiologists. Final diagnosis of focal hepatic lesions was confirmed either by pathologic results for suspicious malignant lesions or by follow-up imaging studies for benign lesions. The CT images were randomly split into a development set (761 CT series) and a validation set (589 CT series). The development set was further divided into 568 CT scans for training the deep learning based malignant hepatic lesion detection model and 193 CT scans for finding the operational parameter by using the jackknife alternative free-response receiver-operating characteristic (JAFROC) figure of merit (FOM) for per-lesion-based analysis. Diagnostic performances of the developed model were tested in the validation set as sensitivity and false positive (FP) rate per case.

RESULTS

A total of 1348 focal hepatic lesions (462 benign lesions and 886 malignant nodules including 825 HCCs and 61 non-HCC malignancies) in the development set and 809 focal hepatic lesions (415 benign lesions and 394 malignant nodules including 377 HCCs and 17 non-HCC malignancies) in the validation set were labeled. The operational parameter was selected by the JAFROC FOM and applying less than 3 FPs criteria. The detection performance of malignant hepatic lesions was 89 % of sensitivity and 2.54 FP rate in the validation set.

CONCLUSION

The deep learning-based system showed high diagnostic performance for detecting malignant hepatic lesions.

CLINICAL RELEVANCE/APPLICATION

Deep-learning based detection system has potential to be a promising tool to help radiologists to accurately detect focal hepatic malignancies on multi-phase CT.

SSE09-03 Evaluating Appropriate Role of Artificial Intelligence in Preoperative Abdomen CT Assessment for Living Donor Liver Transplants (LDLT)

Monday, Dec. 2 3:20PM - 3:30PM Room: N230B

Participants
Abhishek Agarwal, MD, New Delhi , India (*Presenter*) Nothing to Disclose
Suthirth Vaidya, BEng,MENG, Bengaluru, India (*Abstract Co-Author*) Stockholder, Predible Health
Digvijay S. Mahra, BEng, Bengaluru, India (*Abstract Co-Author*) Stockholder, Predible Health
Adarsh Raj, BEng, Bengaluru, India (*Abstract Co-Author*) Stockholder, Predible Health
Krishna Chaitanya Kaluva, BEng,MENG, Bangalore, India (*Abstract Co-Author*) Employee, Predible Health
Abhijith Chunduru, MENG, Bengaluru, India (*Abstract Co-Author*) Stockholder, Predible Health
Bharat Aggarwal, MBBS, MD, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Abhishek.Agarwal@maxhealthcare.com

PURPOSE

In LDLT, assuring appropriate graft size via evaluation of liver and segmental volumes is a major predictor of safe, successful outcomes. The analysis comprises of two key steps: 1. Segmentation of liver and hepatic vascular structures, and 2. Liver Resection to calculate graft and remnant volumes. Here we aim to study preoperative LDLT assessment using 3 different approaches: A: Fully Manual (Hepatic anatomy is segmented by manual contouring followed by manual resection), B: AI with Manual Resection (Hepatic anatomy is automatically segmented using AI and a radiologist resects manually), and C: Fully Automated (Hepatic anatomy is automatically segmented and resected by AI with no radiologist intervention).

METHOD AND MATERIALS

Our developed AI system comprised of 3 CNN models trained on 324 triphasic contrast-enhanced CTs and validated on 100 CTs from multiple institutions for liver and veins segmentation and middle hepatic vein (MHV) classification. For automated resection (C), we sample points from the MHV and IVC to draw a resection plane and return the graft and remnant volumes. 100 retrospective abdomen CT scans with preoperative analysis done were extracted from a large tertiary hospital. 6 studies were excluded due to incomplete information. On the remaining 94 CTs, the graft and remnant volumes were generated for A, B, and C. Intraoperative surgical weights were collected for comparison as ground truth.

RESULTS

We measured the variance of graft volume for A, B, and C against intraoperative surgical weight. B has the least overall variance of 9.14%, followed by C (9.32%) and A (10.62%) on 94 cases. A close correlation (variance < 5%) with the weight was seen in 40 cases using C as compared to 39 cases using B and 32 cases using A. Fig 1 shows the boxplot of the variance of A, B, and C.

CONCLUSION

Amongst the 3 approaches for LDLT analysis, AI with Manual Resection (B) and Fully Automated (C) give the best results, with B displaying the least overall variance.

CLINICAL RELEVANCE/APPLICATION

While AI can automate routine mundane tasks such as hepatic structure segmentation, an AI system coupled with expert intervention is poised to deliver better outcomes in Liver Transplant Planning.

SSE09-04 AI For Detecting Serrated Polyps in CT Colonography

Monday, Dec. 2 3:30PM - 3:40PM Room: N230B

Participants
Janne J. Nappi, PhD, Boston, MA (*Presenter*) Royalties, Hologic, Inc Royalties, MEDIAN Technologies
Tomoki Uemura, MS,BA, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Perry J. Pickhardt, MD, Madison, WI (*Abstract Co-Author*) Stockholder, SHINE Medical Technologies, Inc; Stockholder, Elucent Medical; Advisor, Bracco Group;
David H. Kim, MD, Middleton, WI (*Abstract Co-Author*) Shareholder, Cellectar Biosciences, Inc; Shareholder, Elucent Medical;
Hiroyuki Yoshida, PhD, Boston, MA (*Abstract Co-Author*) Patent holder, Hologic, Inc; Patent holder, MEDIAN Technologies;

For information about this presentation, contact:

yoshida.hiro@mgh.harvard.edu

PURPOSE

To evaluate the performance of AI in automated detection of serrated polyps in CT colonography (CTC).

METHOD AND MATERIALS

A total of 101 CTC cases with biopsy-confirmed serrated polyps were collected from a prospectively acquired database of patients enrolled in a CTC screening program. The patients were prepared for the CTC examination with saline laxative and fecal tagging by 250 ml barium sulfate and 60 ml of iodine-based diatrizoate. The CTC data were acquired using a section collimation of 1.25 mm with 1-mm reconstruction interval, noise index of 50, 30-150 mA, and 120 kVp. Polyps were detected from the CTC datasets automatically by use of an AI algorithm that was designed to detect the contrast-coating phenomenon of serrated polyps in combination with a 3D-convolutional neural network. For pilot evaluation, the detection accuracy of the AI algorithm was evaluated by use of 10-fold per-patient cross validation.

RESULTS

There were 144 serrated polyps >=6 mm in size: 76 polyps were >=10 mm and 68 polyps were 6-9 mm in size. Sixty-six (46%) of the polyps were flat lesions. Contrast coating was visible on 131 (91%) of the polyps. The average per-polyp detection sensitivity was 93±7% at 0.8±1.8 false-positive (FP) prompts per patient on average. The average per-patient sensitivity for polyps >=10 mm (for polyps 6-9 mm) was 94±9% (96±7%) at 0.1±0.2 (0.6±1.9) FPs per patient on average.

CONCLUSION

The contrast coating of serrated polyps provides an effective biomarker for AI to detect serrated polyps at a high sensitivity in CTC.

CLINICAL RELEVANCE/APPLICATION

Serrated polyps were recently discovered to represent a new pathway into colorectal cancers. Current CADe systems have not been designed to detect serrated polyps.

SSE09-05 Machine Learning-Based Ultrasomics Improved Diagnostic Performance in Differentiating Focal Nodular Hyperplasia and Atypical Hepatocellular Carcinoma

Monday, Dec. 2 3:40PM - 3:50PM Room: N230B

Participants
Wei Li, PhD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Bo-Wen Zhuang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Wei Wang, MD, Guangzhou, China (*Presenter*) Nothing to Disclose
Xiao-Yan Xie, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Ming de Lu, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Xin Li, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

liwei259@mail.sysu.edu.cn

PURPOSE

To investigate whether machine learning-based ultrasomics of contrast enhanced ultrasound (CEUS) can improve the diagnostic performance in differentiation of focal nodular hyperplasia (FNH) and atypical hepatocellular carcinoma (aHCC).

METHOD AND MATERIALS

A total of 226 focal liver lesions, including 107 aHCC and 119 FNH underwent CEUS, were reviewed retrospectively. For machine

learning-based ultrasomics, 3,132 features were extracted from images of baseline, arterial and portal phases respectively. An ultrasomics signature was generated by using the least absolute shrinkage and selection operator (LASSO) logistic regression model. Predictive model was developed using the support vector machine trained with following groups: (i) ultrasomics features, (ii) radiologist's score, (iii) combination of ultrasomics and radiologist's score. The area under the curve (AUC) of operating characteristic was used to explore their performances. The clinical usefulness was assessed by decision curve analysis (DCA).

RESULTS

Fourteen ultrasomics features were selected to build an ultrasomics signature, and they presented good performance in the differentiation of FNH and aHCC with an AUC of 0.860, sensitivity of 76.6%, and specificity of 79.0%. The model trained with combination of ultrasomics and radiologist's score had a significantly higher AUC (0.927) than radiologist's score (AUC: 0.840, $P < 0.001$). Adding an ultrasomics signature into radiologist's feature score significantly improves the accuracy of the model in differentiating FNH from aHCC. DCA demonstrated that the combination of ultrasomics and radiologist's score model had the highest net benefit compared with both the other models.

CONCLUSION

The machine learning-based ultrasomics is as good as the staff radiologist in predicting the differential diagnosis of FNH and atypical HCC. Incorporating ultrasomics signature into radiologist's score improves the diagnostic performance in FHN and aHCC.

CLINICAL RELEVANCE/APPLICATION

Adding an ultrasomics signature into radiologist's feature score can significantly improve the accuracy of the model in discrimination of FNH and aHCC.

SSE09-06 Texture Analysis and Machine Learning for Quantification of Liver Fibrosis in MRI: Correlation with MR Elastography and Histopathology

Monday, Dec. 2 3:50PM - 4:00PM Room: N230B

Participants
Khoschy Schawkat, MD, Boston, MA (*Presenter*) Nothing to Disclose
Alexander Ciritsis, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Sophie von Ulmenstein, Zurich , Switzerland (*Abstract Co-Author*) Nothing to Disclose
Hanna Honcharova-Biletska, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Christoph Jungst, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Achim Weber, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Christoph Gubler, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Joachim Mertens, Zurich, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Caecilia S. Reiner, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

kschawka@bidmc.harvard.edu

PURPOSE

To assess the diagnostic accuracy of texture analysis (TA) derived parameters of T1w in-phase (ip) and T2w fat-saturated (fs) images in comparison to MR elastography (MRE) for the diagnosis of liver fibrosis using a machine learning approach.

METHOD AND MATERIALS

Routine liver MRIs including MR elastography (MRE) of 79 patients (mean age 48 years, range 18 - 71) with suspected or known chronic liver disease, performed between 2015 and 2018, were retrospectively analyzed. Two readers performed TA measurements using an open-source software (MaZda, v. 3.20). Gray-level normalization was performed with the TA software by rescaling the histogram data to fit within μ-gray-level mean ± 3 standard deviations. The regions-of-interest were set manually on axial T1w ip and T2w fs images according to the MRE analysis by two independent readers. Histopathology of liver biopsy (n=78) or resection (n=1) served as reference standard. The patients were categorized into no or low grade fibrosis (0-2) and advanced fibrosis (3-4) groups. The data was split in a 2/3 ratio of model derivation and 1/3 ratio for validation. Machine learning based prediction of liver fibrosis was evaluated by calculating the AUC using a support vector machine (SVM) combined with previously implemented principal component analysis (PCA).

RESULTS

For feature selection, TA features with an intraclass correlation coefficient < 0.8 were excluded from further analysis. For further dimensional reduction PCA with two principal components was implemented. On axial T1w ip, a classification accuracy of 92% and 75% for fibrosis groups 0-2 and 3-4 was achieved, respectively, with K=10 folds using an SVM radial basis function (RBF) kernel. On axial T2w fs, a classification accuracy of 62% for both fibrosis groups (0-2 and 3-4) was achieved. The AUC for TA on T1w ip was similar to MRE (0.82 vs. 0.92, P=0.4066), while the AUC for T2w fs was significantly lower compared to MRE (0.57, p=0.0075).

CONCLUSION

Liver fibrosis levels can be assessed with TA-derived parameters of T1w ip images using a TA and machine learning approach with similar accuracy compared to MRE.

CLINICAL RELEVANCE/APPLICATION

T1w ip images, which are part of routine liver MRI, can serve as an alternative to assess liver fibrosis levels when MRE is not available.

SSE10

Gastrointestinal (Small Bowel, Crohn Disease)

Monday, Dec. 2 3:00PM - 4:00PM Room: N229

GI

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

Participants
Tracy A. Jaffe, MD, Durham, NC (*Moderator*) Nothing to Disclose
Joel G. Fletcher, MD, Rochester, MN (*Moderator*) Grant, Siemens AG; Consultant, Medtronic plc; Consultant, Takeda Pharmaceutical Company Limited; Grant, Takeda Pharmaceutical Company Limited; ;

Sub-Events

SSE10-01 Comparison of a Simplified MR Index of Activity With and Without Gadolinium for Assessing Luminal Disease and Therapeutic Response in Patients with Crohn's Disease

Monday, Dec. 2 3:00PM - 3:10PM Room: N229

Participants
Jordi Rimola, MD, Barcelona, Spain (*Presenter*) Consultant, Robarts Clinical Trials, Inc; Research Consultant, Takeda Pharmaceutical Company Limited;
Nunzia Capozzi, Bologna, Italy (*Abstract Co-Author*) Fellowship funded, Bracco Group
Agnes Fernandez-Clotet, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Sonia Rodriguez, MD, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Ingrid Ordas, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Julian Panes, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jrimola@clinic.cat

PURPOSE

Recent concerns on repeated use of gadolinium (Gd) increased the interest in determining if it could be avoided to assess inflammation in Crohn's disease (CD). The aim of this study is to compare the accuracy and the reliability of MRE for detecting activity and response to treatment using a simplified MRE index with and without Gd-enhanced sequences.

METHOD AND MATERIALS

We prospectively included patients with CD that presented at least one intestinal segment with active and severe inflammation at endoscopy (segmental CDEIS >8.5 or presence of ulcers). The accuracy of the simplified MaRIA (sMaRIA) and its responsiveness was determined at baseline and after 46 weeks of treatment with biological drugs. Endoscopy (CDEIS) was considered the gold standard. The sMaRIA was read independently by two readers, at first using non-Gd- enhanced sequences (set 1: T2-w and DWI), and after 1 month of washout using the full set of images (set 2: T2-w, DWI and T1-Gd-enhanced images). An adjudicator solved differences between readers.

RESULTS

Data from 50 patients at baseline were available and 270 intestinal segments were explored by both MRE and ileocolonoscopy. Of them, 39 patients had MRE and ileocolonoscopy at week 46. On a segment-by-segment analysis, at baseline, both sets 1 and 2 had similar sensitivity (86% vs. 89%; p=0.6) and specificity for detecting activity (92% vs. 93%; p=0.6) and similar sensitivity (87% vs. 85%; p=0.99) and specificity (95% vs. 94%; p=0.5) for detecting severe inflammation. Both sets were similarly accurate for detecting endoscopic ulcer healing (sMaRIA<2) after 46 weeks of treatment (85% vs. 91% p=0.45). Intraclass-correlation between set 1 and set 2 were similar at baseline (0.82 vs. 0.85 p=0.45) and also after treatment (0.74 vs. 0.67 p=0.13). The correlation of magnitude of changes between CDEIS and sMaRIA was moderate and significant using both sets (r=0.73 [95IC: 63-82]; p<0.001 for set 1; and r=0.69 [95IC: 56-79]; p<0.001 for set 2).

CONCLUSION

The sMaRIA can be applied without the use of gadolinium maintaining high accuracy and reliability for both detection and grading luminal inflammation and therapeutic response.

CLINICAL RELEVANCE/APPLICATION

In patients with Crohn's disease MRE without the use of gadolinium may detect active luminal disease and changes after treatment maintaining high accuracy and reliability.

SSE10-02 Role of Supplementary Anal Imaging in Magnetic Resonance Enterography in Crohn's Patients Not Suspected to Have Perianal Fistula

Monday, Dec. 2 3:10PM - 3:20PM Room: N229

Participants
Pyeong Hwa Kim, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose

Seong Ho Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Research Grant, Central Medical Service Co, Ltd
Kiok Jin, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jong Seok Lee, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyun Jin Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ah Young Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To prospectively evaluate the role of brief anal scan supplementary to magnetic resonance enterography (MRE) in Crohn's disease (CD) patients not suspected to have perianal fistula.

METHOD AND MATERIALS

Between June 2012 and December 2017, we added a brief anal scan to MRE in 451 consecutive adults who were diagnosed with or suspected of CD and were not suspected to have perianal fistula. Images were examined for the presence of perianal tracts; if present, colorectal surgeons reexamined the patient. Patients were followed-up to determine if and when they underwent surgery for perianal fistula/abscess. The diagnostic yield of anal MR imaging for detecting perianal tracts, associated factors, and natural history of MR-detected asymptomatic perianal tracts were determined. Multivariable analysis was performed.

RESULTS

A total of 440 CD patients (mean age±SD, 29.6±8.9 years; 345 men and 95 women) were analyzed. On anal MR, 12% (53 patients; 95% CI, 9.3-15.4%) showed perianal tracts. Reexamination by the surgeons was unremarkable and required no additional treatments in all patients. The tracts were mostly single unbranched (83%), inter-sphincteric (72%), and showing a linear dark signal at the tract margin (79%). Younger age at MRE, female sex, and higher CD activity index score were independently associated with detection of perianal tracts on anal MR. Presence of MR-detected asymptomatic tracts was an independent risk factor for future surgery for perianal fistula/abscess: 17.8% cumulative incidence at 37 months and an adjusted hazard ratio of 3.457 (95% CI, 1.103-10.836; P=0.033).

CONCLUSION

The diagnostic yield of supplementary anal MR was 12%. The MR-detected asymptomatic tracts did not require additional treatments, mostly showed findings of chronicity or healing, but were an independent risk factor for future anal surgery.

CLINICAL RELEVANCE/APPLICATION

The supplementary anal MR may have a role in the early identification of CD patients who are at risk of perianal complications and may help direct more attention to their management.

SSE10-03 A Novel Diffusion Kurtosis Imaging-Based Nomogram for Assessment of Bowel Fibrosis in Patients with Crohn's Disease

Monday, Dec. 2 3:20PM - 3:30PM Room: N229

Participants
Jinfang Du, Guangzhou , China (*Presenter*) Nothing to Disclose
Xuehua Li II, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Yitao Mao, Changsha, China (*Abstract Co-Author*) Nothing to Disclose
Li Huang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Shiting Feng, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Zi-ping Li, Guangzhou , China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

dujinfangchn@163.com

PURPOSE

To develop a prediction model based on magnetic resonance imaging (MRI) variables for individualized assessment of bowel fibrosis in patients with Crohn's disease (CD) using surgical histopathology as a reference standard.

METHOD AND MATERIALS

Thirty-one consecutive patients (eighty-one bowel specimens) with CD undergoing conventional MRI and diffusion kurtosis imaging (DKI; b values, 0-2000 s/mm2) preoperatively were recruited as a test set. We observed T2-weighted signal intensity and enhancement pattern on conventional MRI, and measured the apparent diffusion coefficient (ADC) from monoexponential model, apparent diffusional kurtosis (Kapp), and apparent diffusion for non-Gaussian distribution (Dapp) from non-Gaussian DKI model. Histologic fibrosis was graded as non-to-mild and moderate-to-severe. Multivariate logistic regression analysis was performed to identify risk factors to be included into the nomogram to characterize the degree of bowel fibrosis. Its performance was validated on nine new patients (eighteen bowel specimens) with CD.

RESULTS

Significant differences in Kapp (P<0.001), Dapp (P<0.001), and ADC (P<0.001) were found between non-to-mildly and moderately-to-severely fibrotic bowel walls but not in T2WI signal intensity (P=0.210) or enhancement pattern (P=0.748). A strong correlation of histologic fibrosis scores with Kapp (r=0.604, P<0.001) was found, which was followed by Dapp (r=-0.491, P<0.001) and ADC (r=-0.270, P=0.015). Independent factors derived from multivariate logistic regression analysis to assess degree of bowel fibrosis were Kapp, Dapp on DKI. Internal and external validation revealed good performance of the nomogram with concordance index of 0.901 (95% confidence interval 0.824-0.978) and 1.000, respectively, for differentiating non-to-mild from moderate-to-severe fibrosis. The calibration plot reveals a strong agreement between actual and predicted probability of bowel fibrosis.

CONCLUSION

We developed and validated a DKI-based prediction model for the non-invasive assessment of bowel fibrosis in patients with CD. This tool is helpful for individualized treatment decision-making.

CLINICAL RELEVANCE/APPLICATION

The DKI-based prediction model can noninvasively assess bowel fibrosis in patients with CD and is beneficial to individualized treatment decision-making.

SSE10-04 Quantification of Crohn's Disease Activity Using Semiautomated Dual-Energy CT Enterography Derived Iodine Density: Correlation with Crohn's Disease Activity Index (CDAI)

Monday, Dec. 2 3:30PM - 3:40PM Room: N229

Participants
Bari Dane, MD, New York, NY (*Presenter*) Nothing to Disclose
Sean Duenas, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Joseph Han, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Thomas P. O'Donnell, PhD, New York, NY (*Abstract Co-Author*) Employee, Siemens AG
Shannon Chang, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Alec J. Megibow, MD, New York, NY (*Abstract Co-Author*) Consultant, Bracco Group

For information about this presentation, contact:

bari.dane@nyumc.org

PURPOSE

To correlate iodine density derived from dual-energy CT enterography (DECTE) with clinical Crohn's disease (CD) activity.

METHOD AND MATERIALS

Twenty patients with CD, imaged with DECTE from 2/2016-5/2018, and available CDAI determinations were retrospectively identified. Using prototype software, 8 manual contours spaced at 45 degree increments were drawn along the mucosa of the entire length of affected bowel segments on curved MPRs created from low kV data (80kV n=17, 90kV n=3). These were then superimposed on the corresponding 150kV data for iodine density calculation at each point along the contours. The software allows the determination of iodine density at specific points, the percentage of iodine density values in specified ranges (1-2mg I/mL, 2-3mg I/mL, etc) and average iodine density along the entire affected segment. Average iodine density across each entire segment was compared to CDAI values. Patient specific iodine density histograms showing percentage of iodine density values within the affected segment were created.

RESULTS

Sixteen patients had clinically active CD (CDAI>150); 4 patients had clinically inactive CD. 13/16 clinically active patients had the greatest percentage of elevated iodine density within the affected segment at least 2-3 mg I/mL with 2 patients in the 3-4 mg I/mL range (average iodine density 2.35±1.0mg/mL). Three clinically active patients had the highest percentage of iodine density only within the 1-2 mg I/mL range, indicating radiologically quiescent disease (average iodine density 1.43±0.49mg/mL, P=0.0016). Two clinically inactive patients had peak iodine density 2-3mg I/mL, indicating radiologically active disease (average iodine density 2.29±0.61mg/mL, compared with 1.84±1.44mg/mL for radiologically inactive disease P=0.18). The average iodine density of active and inactive appearing CD involved bowel were 2.34±0.36mg/mL and 1.60±0.30mg/mL, respectively (P=0.0006). Iodine density maps demonstrated heterogeneous involvement, discriminating between segments with similar average iodine density values. Median effective dose was 4.56±1.68 (2.03-8.12) mSv.

CONCLUSION

Iodine density from DECTE can be used as a biomarker of CD activity. The distribution of iodine density provides additional information about disease activity and complements clinical indices such as CDAI.

CLINICAL RELEVANCE/APPLICATION

Average and regional iodine density from DECTE can be used as a biomarker of CD activity.

SSE10-05 Evaluating the Inflammatory Activity in Crohn's Disease Using Magnetic Resonance Diffusion Kurtosis Imaging

Monday, Dec. 2 3:40PM - 3:50PM Room: N229

Participants
Jingyun Cheng, Wuhan, China (*Abstract Co-Author*) Nothing to Disclose
Guangyao Wu Sr, MD,PhD, Shenzhen, China (*Abstract Co-Author*) Nothing to Disclose
Ke Wang, Wuhan, China (*Abstract Co-Author*) Nothing to Disclose
Panying Wang, MD, Wuhan, China (*Presenter*) Nothing to Disclose
Xiaoyun Leng, Wuhan , China (*Abstract Co-Author*) Nothing to Disclose
Yan Wang, Wuhan , China (*Abstract Co-Author*) Nothing to Disclose
Xiangyu Wang, Shenzhen , China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

wuguangy2002@163.com

PURPOSE

To explore the feasibility of diffusion kurtosis imaging(DKI) for evaluating inflammatory activity in Crohn' s disease(CD).

METHOD AND MATERIALS

In all, 51 CD patients were included, who were performed with consecutive enteroscopy, MR and DKI(b values = 0 - 2000 mm2/s). The lesions of bowel segments were graded as inactive(0-2), mild(3-6), and moderate-severe group(>6) based on simplified endoscopic activity score for Crohn's disease(SES-CD). To compare the ability of the parameters of DKI and DWI in grading different activity lesions.

RESULTS

127 bowel segments including inactive(15), mild(45) and moderate-severe(67) were analyzed. ADC(r = -0.627, P <0.001), Dapp(r = -0.381, P < 0.001) and Kapp(r = 0.641, P < 0.001) were correlated with SES-CD. These parameters were significantly different among the three groups(all P <0.001). ROC analysis found ADC had the highest accuracy(AUC = 0.884, P < 0.001) to differentiate inactive from active group with the threshold at 0.865×10-3 mm2/s, which was slightly higher than Kapp(AUC = 0.867, P < 0.001) with the threshold at 0.645, and was obviously higher than Dapp(AUC = 0.726, P = 0.005). Similarly, ADC also had the highest accuracy(AUC = 0.846, P < 0.001) to differentiate inactive-mild from moderate-severe group with the threshold at 0.825×10-3 mm2/s, and minimally higher than Kapp(AUC = 0.843, P < 0.001) with the threshold at 0.695, and obviously higher than Dapp(AUC = 0.690, P < 0.001).

CONCLUSION

DKI is feasible and comparable to conventional DWI for the evaluation of inflammatory activity in CD.

CLINICAL RELEVANCE/APPLICATION

DKI, as a method for non-invasive non-invasive assessment of free diffusion of water molecules, is not only applied to grade lesions activity about Crohn's disease, but able to provide more useful information about lesion. What's more, DKI, the same as DWI, can be an alternative to contrast-enhanced for pediatric patients or renal failure patients.

SSE10-06 Interobserver Variation in the Interpretation of Enteric Ultrasound for Crohn's Disease

Monday, Dec. 2 3:50PM - 4:00PM Room: N229

Participants
Gauraang Bhatnagar, FRCR,MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose
Laura Quinn, Birmingham, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Anthony Higginson, Portsmouth, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Andrew Plumb, MBBCh, MRCP, Stockport, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Steve Halligan, MD, Herts, United Kingdom (*Abstract Co-Author*) Research Consultant, iCad, Inc
Damian J. Tolan, MBBCh, FRCR, Leeds, United Kingdom (*Abstract Co-Author*) Speaker, Bracco Group Speaker, Merck & Co, Inc
Roger Lapham, Leeds, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Sue Mallett, DIPLPHYS,MS, Birmingham, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Stuart A. Taylor, MBBS, Great Missenden, United Kingdom (*Abstract Co-Author*) Research Consultant, Robarts Clinical Trials, Inc; Shareholder, Motilent

For information about this presentation, contact:

g.bhatnagar@nhs.net

PURPOSE

Quantifying interobserver variability is an important part in evaluating medical imaging. To date there has been little research into interobserver variability in enteric ultrasound (US) across multiple observers

METHOD AND MATERIALS

The study utilised patients recruited to a prospective trial comparing the diagnostic accuracy of MRE and US for CD (newly diagnosed or relapsing) across 8 hospitals. A construct reference standard (multidisciplinary panel diagnosis) was used in the trial, incorporating 6 months of patient follow up. 38 patients (11 new diagnosis, 27 relapse) from 2 recruitment sites underwent repeat US examinations on the same day performed by 2 practitioners from a pool of 7. Practitioners were blinded to each other's interpretation, patient's symptoms and previous disease history, and documented the presence and location of small bowel and colonic disease. Data was analysed separately for the new diagnosis and relapse cohorts. Interobserver variability was measured using percentage agreement with the consensus reference standard across the 2 reads, grouped as disease positive or negative. Prevalence adjusted bias adjusted kappa (PABAK) was also reported. Agreement between the radiologists irrespective of agreement with the reference standard was also calculated.

RESULTS

In the new diagnosis cohort, the overall percentage agreement for small bowel disease presence against the consensus reference was 82% (52-95% (95%CI)) with a kappa coefficient (κ) of 0.64, (substantial agreement). Agreement for colonic disease presence was 64%, κ of 0.27 (fair agreement). In the relapse cohort, agreement for small bowel disease presence was 81%, κ of 0.63 (substantial agreement). Agreement for colonic disease presence was 78%,κ of 0.56 (moderate agreement). Simple agreement between practitioners was higher when disregarding correspondence with the consensus reference, (84% and 87% for small bowel and colonic disease presence respectively).

CONCLUSION

Based on data from a multi-reader, multicenter prospective trial, there is substantial agreement between practitioners for the presence of small disease against an independent standard of reference

CLINICAL RELEVANCE/APPLICATION

Compared to an independent standard of reference there is substantial agreement between practitioners for the presence of small bowel disease on US, supporting wider dissemination.

VSIO22

Interventional Oncology Series: Primary Liver Cancer-Update on Therapeutic Options and Future Outlook

Monday, Dec. 2 3:15PM - 5:15PM Room: E450B

GI IR OI RO

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.25

FDA Discussions may include off-label uses.

Participants
Anne M. Covey, MD, New York, NY (*Moderator*) Stockholder, Amgen Inc; Advisory Board, Accurate Medical
Nadine Abi-Jaoudeh, MD, Orange, CA (*Moderator*) Research collaboration, Koninklijke Philips NV; Research collaboration, Teclison Cherry Pharma Inc; Research support, SillaJen, Inc; Intellectual property and Owner, Bruin Biosciences Inc

For information about this presentation, contact:

coveya@mskcc.org

LEARNING OBJECTIVES

1) Learn which patients are most likely to benefit from locoregional treatment of hepatocellular carcinoma. 2) Understand how locoregional therapies fit into the overall treatment plan of patients with hepatocellular carcinoma and how systemic treatments may affect patient selection. 3) Describe the rational and potential therapeutic combinations of locoregional and systemic therapy for patients with hepatocellular carcinoma.

Sub-Events

VSIO22-01 Transplant/Resection for HCC

Monday, Dec. 2 3:15PM - 3:30PM Room: E450B

Participants
Parissa Tabrizian, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Parissa.tabrizian@mountsinai.org

LEARNING OBJECTIVES

1) Review the role of liver resection and transplantation for patients with HCC. 2) Discuss outcomes in patients with HCC undergoing liver resection or transplantation. 3) Describe the impact of locoregional therapy on a surgical practice.

VSIO22-02 Ablation for HCC

Monday, Dec. 2 3:30PM - 3:45PM Room: E450B

Participants
Bernhard Gebauer, MD, Berlin, Germany (*Presenter*) Speaker, PAREXEL International Corporation; Speaker, ICON plc; Speaker, BAYER AG; Speaker, F. Hoffmann-La Roche Ltd; Speaker, Pfizer Inc; Speaker, Guerbet SA; Speaker, Sirtex Medical Ltd

For information about this presentation, contact:

bernhard.gebauer@charite.de

LEARNING OBJECTIVES

1) Compare different techniques of ablation in HCC. 2) Identify patients profit from ablation. 3) Describe complications of ablation. 4) Identify complete ablation and local recurrence in follow-up.

VSIO22-03 Microwave Ablation versus Radiation Segmentectomy for Treatment-Naïve Early-Stage Hepatocellular Carcinoma

Monday, Dec. 2 3:45PM - 3:55PM Room: E450B

Participants
Mohamed Soliman, New York City, NY (*Presenter*) Nothing to Disclose
Madhu R. Joshi, Brooklyn, NY (*Abstract Co-Author*) Nothing to Disclose
Maria Mitry, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Caroline C. Chung, NYC, NY (*Abstract Co-Author*) Nothing to Disclose
Russell Rosenblatt, MD, NYC, NY (*Abstract Co-Author*) Nothing to Disclose
Resmi Charalel, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

rac9069@med.cornell.edu

PURPOSE

To compare treatment efficacy of microwave ablation (MWA) and radiation segmentectomy (RS) in treatment of solitary hepatocellular carcinoma (HCC) less than 3 cm.

METHOD AND MATERIALS

Following IRB approval, all patients with cirrhosis who underwent locoregional treatment (LRT) for HCC at a single academic institution between 2005-2018 were reviewed. Patients who had prior HCC treatment, multifocal HCC or HCC larger than 3cm in maximum axial diameter were excluded. A total of 26 treatment-naïve patients were identified and reviewed. The primary endpoint is median overall survival (OS), analyzed via Kaplan-Meier method. Patients were censored at time of surgery, transplantation, or last known follow-up. The secondary endpoint is progression-free survival (PFS) following LRT. Baseline patient demographics and characteristics were compared between the two groups using a non-paired t-test. Treatment toxicities were assessed by measuring changes in liver function tests pre- and 1-month post LRT, from which MELD-Na scores were calculated and compared.

RESULTS

A total of 17/26 (65%) patients received MWA, while 9/26 (35%) received RS. There was no statistically significant differences between the groups in age (71 vs. 73, p=0.53), gender (64% vs. 72% male, p=0.492), cirrhosis etiology, presence of major medical comorbidities (DM, CAD, COPD), or tumor size (1.7cm vs. 2.4cm, p=0.5). In terms of treatment safety, RS was associated with higher 1-month post-treatment elevation in AST and ALT (p=0.034) compared to MWA. There was no statistically significant difference (p=0.50) in median PFS between the two groups (1289 days (95% CI = 828-NA) for the MWA group and 1029 days (95% CI = 620-NA) for the RS group). The median OS in the RS group was 1879 days, while median OS in the MWA group could not be estimated because only 2 mortality events were recorded over 20 months median follow-up period.

CONCLUSION

There was no significant difference in median PFS between RS and MWA for early-stage HCC; however, RS is associated with higher rates of hepatoxicity at 1 month. Larger, prospective studies are needed to further assess differences in treatment efficacy and toxicity.

CLINICAL RELEVANCE/APPLICATION

RS is a safe and efficacious treatment option for treatment-naïve patients with early-stage HCC, with similar local tumor control rate as MWA. Clinical judgement is imperative in choosing the theraputic intervention.

VSIO22-04 Update on Transarterial Therapies for HCC

Monday, Dec. 2 3:55PM - 4:10PM Room: E450B

Participants
Gregory J. Nadolski II, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review BCLC Tx recommendations for HCC. 2) Examine some issues with BCLC recommendations as compared to clinical practice and experience. 3) Discuss data on response to different embolization treatments.

ABSTRACT

N/A

VSIO22-05 Preoperative Transcatheter Arterial Chemoembolization for Surgical Resection of Huge Hepatocellular Carcinoma (>= 10 cm): A Multicenter Propensity Matching Analysis

Monday, Dec. 2 4:10PM - 4:20PM Room: E450B

Participants
Yang Tian, Shanghai , China (*Abstract Co-Author*) Nothing to Disclose
Chao Li, Shanghai , China (*Abstract Co-Author*) Nothing to Disclose
Wang Xinrong, Shanghai , China (*Presenter*) Nothing to Disclose
Mingda Wang, Shanghai , China (*Abstract Co-Author*) Nothing to Disclose
Han Wu, Shanghai , China (*Abstract Co-Author*) Nothing to Disclose
Jiongjie Yu, Shanghai , China (*Abstract Co-Author*) Nothing to Disclose
Timothy M. Pawlik, Columbus , OH (*Abstract Co-Author*) Nothing to Disclose
Jun Han, Shanghai , China (*Abstract Co-Author*) Nothing to Disclose
Hao Xing, Shanghai , China (*Abstract Co-Author*) Nothing to Disclose
Zhenli Li, Shanghai , China (*Abstract Co-Author*) Nothing to Disclose
Wanyee Lau, Shanghai , China (*Abstract Co-Author*) Nothing to Disclose
Mengchao Wu, Shanghai , China (*Abstract Co-Author*) Nothing to Disclose
Feng Shen, Shanghai , China (*Abstract Co-Author*) Nothing to Disclose
Yahao Zhou, Yunnan , China (*Abstract Co-Author*) Nothing to Disclose
Tinghao Chen, Sichuan , China (*Abstract Co-Author*) Nothing to Disclose
Hong Wang, Hunan, China (*Abstract Co-Author*) Nothing to Disclose
Weimin Gu, Heilongjiang, China (*Abstract Co-Author*) Nothing to Disclose
Yaoming Zhang, Meizhou, China (*Abstract Co-Author*) Nothing to Disclose
Wanguang Zhang, Wuhan, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yangtianehbh@smmu.edu.cn

PURPOSE

Surgical resection for hepatocellular carcinoma (HCC) is potentially curative, but long-term survival remains unsatisfactory. There is currently no effective neoadjuvant or adjuvant therapy for HCC. We sought to evaluate the impact of preoperative transcatheter

arterial chemoembolization (TACE) on long-term prognosis after surgical resection of huge HCCs (>= 10 cm).

METHOD AND MATERIALS

Using a multicenter database, consecutive patients who underwent curative-intent resection for huge HCC without macrovascular invasion between 2004 and 2014 were identified. The association between preoperative TACE with perioperative outcomes, long-term overall survival (OS) and recurrence-free survival (RFS) was assessed before and after propensity score matching (PSM).

RESULTS

Among the 377 enrolled patients, 88 patients (23.3%) received preoperative TACE. The incidence of perioperative mortality and morbidity was comparable among patients who did and did not undergo preoperative TACE (3.4% vs. 2.4%, P=0.704, and 33.0% vs. 31.1%, P=0.749, respectively). PSM analysis created 84 matched pairs of patients. In examining the entire cohort as well as the PSM cohort, median OS (overall cohort: 32.8 vs. 22.3 months, P=0.035, and PSM only: 32.8 vs. 18.1 months, P=0.023, respectively) and RFS (12.9 vs. 6.4 months, P=0.016, and 12.9 vs. 4.1 months, P=0.009, respectively) were better among patients who underwent preoperative TACE versus patients who did not. After adjustment for other confounding factors on multivariable analyses, preoperative TACE remained independently associated with a favorable OS and RFS after resection of huge HCC.

CONCLUSION

Preoperative TACE did not increase perioperative morbidity or mortality, yet was associated with an improved OS and RFS after liver resection of huge HCC.

CLINICAL RELEVANCE/APPLICATION

Preoperative TACE did not increase perioperative morbidity or mortality, yet was associated with an improved OS and RFS and is recommended before liver resection of huge HCC.

VSIO22-06 New Systemic Therapies for HCC and Combination Locoregional and Systemic Therapies

Monday, Dec. 2 4:20PM - 4:35PM Room: E450B

Participants
Farshid Dayyani, MD, Orange, CA (*Presenter*) Speakers Bureau, Amgen Inc; Speakers Bureau, F. Hoffmann-La Roche Ltd ; Speakers Bureau, Ipsen SA; Speakers Bureau, Sirtex Medical Ltd; Speakers Bureau, Exelixis, Inc; Speakers Bureau, Eisai Co, Ltd; Consultant, F. Hoffmann-La Roche Ltd; Consultant, Exelixis, Inc; Consultant, Eisai Co, Ltd; Research support, F. Hoffmann-La Roche Ltd; Research support, Bristol-Myers Squibb Company; Spouse, Employee, F. Hoffmann-La Roche Ltd

LEARNING OBJECTIVES

1) Describe available systemic treatment options for advanced hepatocellular carcinoma. 2) Differentiate available systemic treatment options for advanced hepatocellular carcinoma based on mechanism of action. 3) Recommend appropriate treatment for advanced unresectable hepatocellular carcinoma based on level 1 evidence.

VSIO22-07 Debate: Transarterial Therapy versus Systemic Therapy for BCLC C

Monday, Dec. 2 4:35PM - 4:45PM Room: E450B

Participants
Farshid Dayyani, MD, Orange, CA (*Presenter*) Speakers Bureau, Amgen Inc; Speakers Bureau, F. Hoffmann-La Roche Ltd ; Speakers Bureau, Ipsen SA; Speakers Bureau, Sirtex Medical Ltd; Speakers Bureau, Exelixis, Inc; Speakers Bureau, Eisai Co, Ltd; Consultant, F. Hoffmann-La Roche Ltd; Consultant, Exelixis, Inc; Consultant, Eisai Co, Ltd; Research support, F. Hoffmann-La Roche Ltd; Research support, Bristol-Myers Squibb Company; Spouse, Employee, F. Hoffmann-La Roche Ltd
Gregory J. Nadolski II, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Describe available systemic treatment options for advanced hepatocellular carcinoma. 2) Differentiate treatment options based on mechanism of action. 3) Recommend appropriate treatments based on Level 1 evidence.

VSIO22-08 Cholangiocarcinoma: Classification and Treatment

Monday, Dec. 2 4:45PM - 5:00PM Room: E450B

Participants
William S. Rilling, MD, Milwaukee, WI (*Presenter*) Consultant, BTG International Ltd; Consultant, Terumo Corporation; Consultant, C. R. Bard, Inc; Research support, Guerbet SA

VSIO22-09 New Kids on the Block: SBRT and Other Options for Primary Liver Cancer

Monday, Dec. 2 5:00PM - 5:15PM Room: E450B

Participants
Alexander H. Lam, MD, Orange, CA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1. Discuss loco-regional modalities separate from traditional ablative or transarterial therapies 2. Understand the potential benefits and drawbacks associated with each modality 3. Recognize how these new techniques may fit into the current treatment paradigm

MSCA22

Case-based Review of the Abdomen (Interactive Session)

Monday, Dec. 2 3:30PM - 5:00PM Room: S100AB

GI OB

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Julie H. Song, MD, Sharon, MA (*Director*) Nothing to Disclose

Sub-Events

MSCA22A Women's Imaging

Participants
Christine O. Menias, MD, Chicago, IL (*Presenter*) Royalties, Reed Elsevier

For information about this presentation, contact:

menias.christine@mayo.edu

LEARNING OBJECTIVES

1) Review typical MR imaging of Gynecologic Entities encountered in clinical practice using case-based examples. 2) Highlight Imaging Pearls and Pitfalls that may impact diagnosis and treatment. 3) Discuss potential differential diagnosis and mimics.

MSCA22B Pitfalls in Post-op Abdomen and Pelvis

Participants
Kumaresan Sandrasegaran, MD, Phoenix, AZ (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Sandrasegaran.kumaresan@mayo.edu

LEARNING OBJECTIVES

1) To understand postoperative anatomy after complex gastric and pancreatic surgery. 2) To differentiate between expected postoperative anatomy, postoperative complications and tumor recurrence after abdominal surgery. 3) To learn pitfalls in reporting postoperative CT scans.

ABSTRACT

Reading postoperative CT scans is one of the most challenging tasks in abdominal radiology. The radiologist needs to understand the postoperative anatomy to distinguish what is expected and what would constitute a complication. For patients who had surgery for cancer, it is important not to call expected postoperative findings as cancer recurrence. This presentation delves into pitfalls in postoperative CT and MR for gastric, pancreatic, bowel and oncologic surgery.

MSCA22C Abdominopelvic Trauma Imaging

Participants
Christina A. LeBedis, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Christina.LeBedis@bmc.org

LEARNING OBJECTIVES

1) Review Imaging of abdominal trauma in a case-based format. 2) Discuss common pitfalls and clinically relevant differential diagnosis in abdominal trauma. 3) Discuss protocol considerations to optimize diagnostic yield in abdominal trauma.

MSCA22D Abdominopelvic Emergency Imaging

Participants
Douglas S. Katz, MD, Mineola, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

douglasscottkatzmd@gmail.com

LEARNING OBJECTIVES

1) To review a series of cases of CT of the acute abdomen and pelvis, some of which are challenging. 2) To review the differential diagnosis, if any, for these patients, and to discuss prospective patient management based on the clinical and CT findings. 3) To briefly review the imaging and clinical literature on these entities.

Printed on: 10/29/20

SPDL21

Chest and Abdomen (Case-based Competition)

Monday, Dec. 2 4:30PM - 6:00PM Room: E451B

CH GI

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

Participants
Paul J. Chang, MD, Chicago, IL (*Presenter*) Co-founder, Koninklijke Philips NV; Researcher, Koninklijke Philips NV; Researcher, Bayer AG; Advisory Board, Bayer AG; Advisory Board, Aidoc Ltd; Advisory Board, EnvoyAI; Advisory Board, Inference Analytics; Advisory Board, Subtle Medical
Neety Panu, MD, FRCPC, Ottawa , ON (*Presenter*) Nothing to Disclose
Carla B. Harmath, MD, Chicago, IL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

charmath@radiology.bsd.uchicago.edu

pchang@radiology.bsd.uchicago.edu

Special Information

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

LEARNING OBJECTIVES

1) Be introduced to a series of radiology case studies via an interactive team game approach designed to encourage 'active' consumption of educational content. 2) 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) Receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance.

ABSTRACT

The extremely popular audience participation educational experience, Diagnosis Live!, is an expert-moderated session featuring a series of interactive case studies that will challenge radiologists' diagnostic skills and knowledge. The session features 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 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 review the case material presented during the session, along with individual and team performance.

SPSI21

Special Interest Session: The Best of Radiology in 2019-The Editors of Radiology Keep You Up to Date

Monday, Dec. 2 4:30PM - 6:00PM Room: N227B

BR GI NR RS

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
David A. Bluemke, MD,PhD, Bethesda, MD (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

dbluemke@rsna.org

LEARNING OBJECTIVES

1) Identify key publications over the past year that may affect your clinical practice. 2) Evaluate new research developments in the field of radiological imaging. 3) Describe new developments in radiology that may affect the management of your patients.

ABSTRACT

RADIOLOGY is the leading journal for publications leading to new, important and translatable discoveries in imaging research. In the past year, there continue to be basic developments in radiology, as well as new guidelines and clinical trials in imaging that affect your practice. Overall trends for new scientific studies reflect an increasing number of clinical trials being submitted from around the world in addition to those of North America. Publications from Europe have been prominent in recent years, but new research programs from countries such as Japan, South Korea and China are developing quickly. Large numbers of study subjects in clinical trials are now common, and tends to result in more robust demonstration of the efficacy of imaging interventions. Artificial intelligence applications are becoming commonplace in our publications, as are radiomics studies with increasing large numbers of study subjects. This seminar will highlight the results of key publications in the past year that are most likely to affect your practice in the near future, as well as presenting novel topics that are likely to be important to the field over the next 5 years.

Sub-Events

SPSI21A Review of 2019: New Research that Should Impact your Practice

Participants
David A. Bluemke, MD,PhD, Bethesda, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

DBLUEME@RSNA.ORG

SPSI21B Innovations in Abdominal Imaging in 2019

Participants
Kathryn J. Fowler, MD, San Diego, CA (*Presenter*) Consultant, 12 Sigma Technologies; Researcher, Nuance Communications, Inc; Contractor, Midamerica Transplant Services; ;

SPSI21C Research and Innovations in Breast Imaging in 2019

Participants
Linda Moy, MD, New York, NY (*Presenter*) Grant, Siemens AG; Support, Lunit Inc ; Support, iCad, Inc; Support, FAIR Facebook; Advisory Board, Lunit Inc; Advisory Board, iCad, Inc

SPSI21D New Developments in Neuroimaging in 2019

Participants
Christopher P. Hess, MD, PhD, San Francisco, CA (*Presenter*) Research, Siemens AG; Consultant, General Electric Company;

ED005-TU

Gastrointestinal Tuesday Case of the Day

Tuesday, Dec. 3 7:00AM - 11:59PM Room: Case of Day, Learning Center

AMA PRA Category 1 Credit ™: .50

Participants
Anup S. Shetty, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Cameron Adler, MD, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose
Stephanie T. Chang, MD, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose
Amy K. Hara, MD, Scottsdale, AZ (*Abstract Co-Author*) Nothing to Disclose
Maria Zulfiqar, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Joseph R. Grajo, MD, Gainesville, FL (*Abstract Co-Author*) Nothing to Disclose
Laura L. Magnelli, MD, Gainesville, FL (*Abstract Co-Author*) Nothing to Disclose
Joseph W. Owen, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Michael Nisiewicz, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Andres R. Ayoob, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
James T. Lee, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Rex A. Parker III, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Emilie T. Nguyen, MD, Playa Vista, CA (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Each GI case of the day will be taken from disorders of the luminal GI tract as well as the liver, spleen, pancreas, and biliary system. The findings may be uncommon manifestations of common diseases or common manifestations of uncommon diseases.

SPDL30

Houston, We Have a Problem (Case-based Competition)

Tuesday, Dec. 3 7:15AM - 8:15AM Room: E451B

CA GI GU MK NR OB PD PH SQ VA

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 0

Participants
Adam E. Flanders, MD, Narberth, PA (*Presenter*) Nothing to Disclose
Sandeep P. Deshmukh, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Christopher G. Roth, MD,MS, Philadelphia, PA (*Presenter*) Nothing to Disclose
Vishal Desai, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

adam.flanders@jefferson.edu

Special Information

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

LEARNING OBJECTIVES

1) Be introduced to a series of radiology case studies via an interactive team game approach designed to encourage 'active' consumption of educational content. 2) 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) Receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance.

SPSC30

Controversy Session: MR Elastography versus US Elastography of Liver

Tuesday, Dec. 3 7:15AM - 8:15AM Room: E350

CT GI MR

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

Participants
Bachir Taouli, MD, New York, NY (*Moderator*) Research Grant, Bayer AG; Research Grant, Takeda Pharmaceutical Company Limited; Research Grant, Regeneron Pharmaceuticals, Inc; Consultant, Alexion Pharmaceuticals, Inc; Consultant, Bayer AG; ;
Anthony E. Samir, MD, Boston, MA (*Moderator*) Consultant, Pfizer Inc; Consultant, General Electric Company; Consultant, PAREXEL International Corporation; Research Grant, Koninklijke Philips NV; Research Grant, Siemens AG; Research Grant, Canon Medical Systems Corporation; Research Grant, General Electric Company; Research Grant, Samsung Electronics Co, Ltd; Research Grant, Analogic Corporation; Research support, SuperSonic Imagine; Research support, Hitachi, Ltd; Research contract, Koninklijke Philips NV
Laura Kulik, MD, Chicago, IL (*Presenter*) Speaker, Eisai Co, Ltd; Speaker, Dova; Speaker, Gilead Sciences, Inc; Consultant, Bristol-Myers Squibb Company; Consultant, Bayer AG; Consultant, Exelixis, Inc; Consultant, Eisai Co, Ltd; Consultant, CE Outcomes
Paul S. Sidhu, MRCP, FRCR, London, United Kingdom (*Presenter*) Speaker, Koninklijke Philips NV; Speaker, Bracco Group; Speaker, Hitachi, Ltd; Speaker, Siemens AG; Speaker, Samsung Electronics Co, Ltd; Advisory Board, Samsung Electronics Co, Ltd; Advisory Board, Itreas Ltd
Scott B. Reeder, MD,PhD, Madison, WI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

paulsidhu@nhs.net

LEARNING OBJECTIVES

1) Review the current uses and diagnostic performance of ultrasound and MR elastography of the liver. 2) Review and compare advantages, pitfalls and limitations of ultrasound and MR elastography of the liver.

ABSTRACT

The use of elastography has altered the management of chronic liver disease, and modified the patient pathway. The ability to assess the degree of fibrosis within the accepted classification, either the METAVIR or Ishak scoring systems, allows for clinical diease management. The establishment of elastography in both MR imaging and US imaging has become established, with standrads measured against liver biopsy. The number of liver biopsies for assessment of liver fibrosis has predictably declines as a result. Both imaging techniques have advantages and disadvantages. Advocates of MR imaging indicate the global nature of the measurement, speed of aquisition, whereas the proponents of US based elastograpgy suggest the rapid, cost effective methodology is superior. However the need to image an increasing patient population will require a rapid, portable and acceptable method. This debate will highlight the two techniques, the accuracy, acceptance and reproducibility and allow the audience to come to a conclusion of the usefullnees of each technique.

MSRO31

BOOST: Gastrointestinal-Case-based Multidisciplinary Review (Interactive Session)

Tuesday, Dec. 3 8:30AM - 10:00AM Room: S103AB

GI OI RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Abraham J. Wu, MD, New York, NY (*Presenter*) Research Grant, CivaTech Oncology, Inc
David D. Bates, MD, Hastings On Hudson, NY (*Presenter*) Research support, General Electric Company
Mukta Krane, MD, Seattle, WA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

wua@mskcc.org

LEARNING OBJECTIVES

1) Review anatomy relevant to local staging of rectal cancer. 2) Review the role of MRI in staging and treatment planning. 3) Discuss features of structured reporting in rectal MRI.

ABSTRACT

This lecture will focus on the role of MRI in local staging of rectal cancer, including discussion of relevant anatomy and the benefits of structured reporting.

RC308

Emergency Radiology Series: Current Imaging of the Acute Abdomen

Tuesday, Dec. 3 8:30AM - 12:00PM Room: S401CD

ER GI GU

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

Participants
Douglas S. Katz, MD, Mineola, NY (*Moderator*) Nothing to Disclose
Vincent M. Mellnick, MD, Saint Louis, MO (*Moderator*) Nothing to Disclose

Sub-Events

RC308-01 Abdominal Fluoroscopic Emergencies

Tuesday, Dec. 3 8:30AM - 9:00AM Room: S401CD

Participants
William M. Thompson, MD, Albuquerque, NM (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

thomps132@gmail.com

LEARNING OBJECTIVES

1) Know the ins and outs of performing emergency gastrointestinal examinations. 2) Know the common presentations of emergency esophageal and abdominal disorders. 3) Know how to diagnose the common emergency gastrointestinal disorders demonstrated on fluoroscopic examinations.

RC308-02 Diagnostic Performance and Efficiency of Magnetic Resonance Imaging (MRI) in Suspected Acute Appendicitis

Tuesday, Dec. 3 9:00AM - 9:10AM Room: S401CD

Participants
Nicolas Murray, MD, Vancouver, BC (*Presenter*) Nothing to Disclose
David Jung, West Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Savvas Nicolaou, MD, Vancouver, BC (*Abstract Co-Author*) Institutional research agreement, Siemens AG; Stockholder, Canada Diagnostic Centres

For information about this presentation, contact:

Nicolas.Murray@vch.ca

PURPOSE

Evaluate the diagnostic performance and efficiency of MRI in suspected acute appendicitis compared to ultrasound (US) and computed tomography (CT).

METHOD AND MATERIALS

Single institution, IRB-approved, retrospective study of adult patients presenting to emergency department with suspected acute appendicitis from May 2017 to May 2018. Diagnostic characteristics of US, MRI, and CT were analyzed using a contingency table. Diagnostic efficiency was examined by average patient wait time, defined between times of initial imaging and final management decision.

RESULTS

599 patients met the eligibility criteria, with 445 US (54.7%), 137 MRI (16.9%), and 231 CT scans (28.4%) performed. Sensitivity, specificity and diagnostic yield of MRI were respectively 91.7% (95%CI, 73.0%-99.0%), 85.0% (95%CI, 77.0%-91.0%), and 88.3% (95%CI, 81.9%-92.7%), not significantly different than CT with respective values of 94.3% (95%CI, 84.3%-98.8%), 88.8% (95%CI, 83.2%-93.0%) and 93.1% (95%CI, 89.0%-95.7%). Using an intention-to-diagnose approach, diagnostic properties of US were significantly lower than both MRI and CT ($p<0.01$) with sensitivity of 61.5% (95%CI, 51.5%-70.9%), specificity of 18.2% (95%CI, 14.2%-22.7%), and diagnostic yield of 29.7% (95%CI, 25.6%-34.1%). Mean wait time for patients undergoing MRI as initial investigation (n=21, 3.5%, 100.6 minutes) was not significantly different from patients examined initially by CT (n=133, 22.2%, 104.3 minutes, $p=0.78$) or US (n=238, 39.7%, 125.6 minutes, $p=0.29$). All imaging routes where patients experienced multiple modalities had significantly longer wait times than routes involving one modality ($p<0.01$).

CONCLUSION

Diagnostic performance of MRI is comparable to CT and superior than US. With favourable patient wait times, MRI can be considered as initial investigation modality in suspected acute appendicitis.

CLINICAL RELEVANCE/APPLICATION

The greater role of MRI as first-line investigation modality in suspected acute appendicitis will reduce exposure to ionizing radiation without compromising diagnostic performance or timeliness.

RC308-03 Intraluminal Gas in an Inflamed Non-Perforated Appendix: A Reliable CT Sign of Gangrenous Changes and Imaging Occult Perforation

Tuesday, Dec. 3 9:10AM - 9:20AM Room: S401CD

Participants
Mohammad Haroon, MD, New Delhi, ON (*Presenter*) Nothing to Disclose
Yashmin Nisha, MD, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Blair MacDonald, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Adnan M. Sheikh, MD, Ottawa, ON (*Abstract Co-Author*) Speaker, Siemens AG
Kashif Iqubal, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Paul Anton Reymond Prakash Sathiadoss, MBBS, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Sabarish Narayanasamy, MBBS,MD, Iowa City, IA (*Abstract Co-Author*) Nothing to Disclose
Abhishek Jha, Aligarh, India (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

haroon.radiology@gmail.com

PURPOSE

To assess the utility of intraluminal air in an inflamed, apparently non-perforated appendix in predicting gangrenous changes or occult perforation. Determine, if obstructive appendicolith has an added value in predicting the same.

METHOD AND MATERIALS

This retrospective study was done on adult patients (n=554) of histopathologically proven appendicitis who underwent enhanced MDCT prior to surgery, presenting at our hospital over a consecutive period of 3 years. Patients with obvious CT signs of perforation were excluded to create a cohort of acute uncomplicated appendicitis. These CT were reviewed by an Emergency Radiology Fellow and 2 Emergency Radiologists for presence or absence of intraluminal gas and obstructive appendicoliths. These findings were compared with surgical/pathological results regarding presence or absence of gangrenous/perforated appendicitis. Statistical analysis was performed with the help of contingency tables and sensitivity, specificity, positive and negative predictive values were determined and correlation was tested with Chi-squared test and p value < 0.05 was considered statistically significant.

RESULTS

Of the total 554 cases of acute uncomplicated appendicitis on imaging, 130 had intraluminal gas (90 gangrenous), 178 had obstructive appendicoliths (74 gangrenous) and 66 were with both gas and appendicoliths (50 gangrenous). Sensitivity, specificity, positive and negative predictive values for intraluminal gas and presence or absence of gangrene were 69%, 90%, 69% and 90% respectively. These values for obstructive appendicolith were 42%, 72%, 42% and 72% respectively. These values for the presence of both intraluminal gas and appendicolith were 39%, 96%, 75% and 84% respectively. These values for the presence of either intraluminal gas or appendicoliths were 86%, 69%, 46% and 94% respectively. All these results were significant with p value < 0.05.

CONCLUSION

Presence of intraluminal gas in otherwise acute uncomplicated appendicitis on imaging is a reliable sign of underlying gangrenous changes or image-occult perforation. Presence of obstructive appendicolith, although less reliable sign as an independent risk factor as compared to intraluminal gas, it notably adds to the predective value.

CLINICAL RELEVANCE/APPLICATION

These CT signs are reliable in predicting the risk of gangrene and perforation and can help surgeons to avoid delays in surgery thereby reducing incidence of complications.

RC308-04 Intrapatient Analysis of CT Diagnosis of Acute Diverticulitis: Is Non-Contrast CT Enough?

Tuesday, Dec. 3 9:20AM - 9:30AM Room: S401CD

Participants
Tugce Agirlar Trabzonlu, MD, Chicago, IL (*Presenter*) Grant, Siemens AG
Kevin R. Kalisz, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Kamal Subedi, MBBS, Kathmandu, Nepal (*Abstract Co-Author*) Nothing to Disclose
Donald Kim, DO, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Vahid Yaghmai, MD, Orange, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

tugce.trabzonlu@northwestern.edu

PURPOSE

To evaluate the performance of computed tomography (CT) without oral and intravenous (iv) contrast material for the diagnosis of acute diverticulitis by comparing dual energy CT (DECT) contrast enhanced and virtual non-contrast (VNC) images.

METHOD AND MATERIALS

In this retrospective analysis, we reviewed CT studies with oral and IV contrast obtained with DECT scanner for abdominal pain. Cohort included 153 patients with 306 sets of CT images with a radiological diagnosis of acute diverticulitis (n=76) and control cases without evidence of diverticulitis (n=77) scanned between October 2018 and March 2019. In the first session, the virtual non-contrast images were randomized and analyzed for the presence of diverticulitis. The findings and presence of complication (perforation, abscess formation or fistula) were also noted. In the second session, true contrast enhanced images were randomized

and analyzed. Diagnostic performance of VNC images were compared with contrast enhanced CT studies. Sensitivity, specificity and accuracy were calculated.

RESULTS

Out of 153 patients, 76 (49.7%) had acute diverticulitis and 77 (50.3%) did not have findings of acute diverticulitis on contrast enhanced computed tomography (CECT). 18 of 76 (23.7%) patients with acute diverticulitis had findings of complicated diverticulitis on CECT. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of VNC images were 96.1% (95% CI= 88.9-99.2%), 97.4% (95% CI= 90.9-99.7%), 97.3% (CI= 90.3-99.3%), 96.2% (CI= 89.2- 98.7%) and 96.7% (95% CI= 92.5-98.9%) respectively. The complications of acute diverticulitis was detected in 11 of 18 (61.1%) patients with VNC images.

CONCLUSION

When compared to routine CT imaging with iv and oral contrast, non-contrast images have high diagnostic accuracy for acute colonic diverticulitis. However, for the assessment of the signs of complicated diverticulitis, non-contrast CT had much lower diagnostic performance.

CLINICAL RELEVANCE/APPLICATION

Non-contrast CT can be beneficial for diagnosing uncomplicated diverticulitis. However, the use of contrast remains necessary when complicated diverticulitis is present.

RC308-05 CT in the Setting of Suspected Colonic Diverticulitis: Prevalence and Diagnostic Yield for Diverticular Disease and Alternative Diagnosis in a Large Cohort in 1069 Patients

Tuesday, Dec. 3 9:30AM - 9:40AM Room: S401CD

Participants
Julius M. Weinrich, Hamburg, Germany (*Presenter*) Nothing to Disclose
Peter Bannas, MD, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Maxim Avanesov, MD, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Franziska Schlichting, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Leonie Schmitz, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Azien Laqmani, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Gerhard B. Adam, MD, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Frank Oliver G. Henes, MD, Hamburg, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the prevalence and diagnostic yield of CT in the detection of diverticulitis and alternative diagnoses (AD) in a large cohort of patients with suspected colonic diverticulitis (CD).

METHOD AND MATERIALS

We retrospectively included 1069 patients (560 women) undergoing CT for the evaluation of suspected CD. The final clinical diagnosis derived from the discharge report was used to determine the prevalence of CD and AD and to calculate the diagnostic accuracy of CT. Differences in the prevalence of diagnoses by age (<45;45-69;>=70 y/o) were compared using Cochran-Armitage test with a p-value <0.05 indicating statistical significance.

RESULTS

Prevalence of CD was 52.4% (561/1069) and of AD 40% (427/1069). In the remaining 7.6% (81/1069) no final clinical diagnoses was established. Overall, CT had a sensitivity and specificity of 99.1%/99.8% for diagnosing CD and for AD 92.7%/96.4%, respectively. The prevalence of diverticulitis was significantly lower in patients >=70 y/o (43%; 128/298) when compared with patients <45 y/o (54.1%;100/185) and 45-69 y/o (56.8%;333/586) (p<=0.0004). The most frequent alternative diagnoses were appendicitis (12.6%; 54/427), infectious colitis (10.5%;45/427), infectious enteritis (8.2%;35/427), urolithiasis (6.1%;26/427), and pyelonephritis (4.9%;21/427). Prevalence of specific AD varied significantly according to age (p<0.05). Appendicitis was significantly more frequent in patients <45 y/o (5.4%;10/185), whereas ischemic colitis, hemorrhage and pneumonia were more frequent in patients >=70 y/o. In the latter group colorectal carcinoma was also a frequent AD (10/298).

CONCLUSION

In the clinical setting of suspected diverticulitis the prevalence of acute diverticulitis and alternative diagnoses varies according to age. CT provides high diagnostic accuracy in the diagnosis of both, diverticular disease and alternative conditions.

CLINICAL RELEVANCE/APPLICATION

Clinicians must be aware that in about 40% of patients with suspected diverticulitis alternative diagnoses are the causes for their symptoms, and that there is an age-related prevalence of AD.

RC308-06 Ultrasound of First Trimester Pregnancy

Tuesday, Dec. 3 9:40AM - 10:10AM Room: S401CD

Participants
Mariam Moshiri, MD, Bellevue, WA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

moshiri@uw.edu

LEARNING OBJECTIVES

1) Learn essential criteria for diagnosis of a normal viable first trimester pregnancy. 2) Learn essential criteria for differentiating an ectopic pregnancy from intrauterine pregnancy, and various ectopic pregnancies. 3) Learn appropriate use of such terms as 'pregnancy of unknown location', findings suspicious for early pregnancy failure', etc as outline by SRU lexicon and criteria.

ABSTRACT

Imaging evaluation of first trimester pregnancy especially in an emergent setting can pose dilemmas since in early pregnancy a gestational sac may not be clearly visible. Differentiating an IUP from an ectopic pregnancy is crucial as the latter requires clinical intervention. There is some overlap of serum BhCG levels with IUP, ectopic pregnancy, and spontaneous pregnancy loss. in 2012, SRU consensus panel published their agreed upon criteria and lexicon for reporting first trimester ultrasound exams. We will review the clinical application of these criteria and the lexicon, and review appearance of various types of ectopic pregnancies.

RC308-07 Dual-energy CT of the Acute Abdomen: Current Status

Tuesday, Dec. 3 10:20AM - 10:50AM Room: S401CD

Participants
Savvas Nicolaou, MD, Vancouver, BC (*Presenter*) Institutional research agreement, Siemens AG; Stockholder, Canada Diagnostic Centres

For information about this presentation, contact:

savvas.nicolaou@vch.ca

LEARNING OBJECTIVES

1) Explain the principles of Dual Energy CT/Spectral imaging. 2) Describe and apply 3-material decomposition. 3) Evaluate application of 3-material decomposition in select cases (organ perfusion in trauma, bowel ischemia, active bleeding, renal stone analysis).

RC308-08 Facilitating Acute Bowel Ischemia Diagnosis: Value of Low-keV Monoenergetic Imaging and Color-Coded Iodine Maps in Dual-Energy CT

Tuesday, Dec. 3 10:50AM - 11:00AM Room: S401CD

Participants
Elina Khasanova, MD, Vancouver, BC (*Presenter*) Nothing to Disclose
Sunghan Jung, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Francesco Macri, MD, PhD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Christopher Lunt, MBChB,MRCS, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Yuhao Wu, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Gavin M. Sugrue, MBBCh, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Nicolas Murray, MD, Vancouver, BC (*Abstract Co-Author*) Nothing to Disclose
Savvas Nicolaou, MD, Vancouver, BC (*Abstract Co-Author*) Institutional research agreement, Siemens AG; Stockholder, Canada Diagnostic Centres

For information about this presentation, contact:

elina.khasanova@vch.ca

PURPOSE

To assess the impact of virtual monoenergetic imaging (VMI) and color-coded iodine-overlay images (IOI) on reader confidence and image quality (IQ) in the detection of hypoperfused bowel compared to simulated 120-kVp images (s-120-kVp).

METHOD AND MATERIALS

Institutional review board approval was obtained. Acute bowel ischemia was reported in 80 patients imaged with triphasic CT studies with the portal venous phase acquired with dual energy analysis (90-150 snVp; 3rd generation dual source CT) from 01/02/2016 to 31/12/2018. Of 80 patients, 26 (33%) had bowel ischemia confirmed intra-operatively, 11(14%) deceased within 72 hours, 43 (53%) did not qualify for surgery. S-120-kVp, VMI (40, 50, 60 keV) and IOI (40%, 50%, 60% of iodine overlay color-coded saturation) datasets were created for each patient. Quantitative assessment (HU and CNR) on ischemic bowel, normal bowel, and portal vein was performed only on the surgically proven cases (n=26). Two emergency radiologists independently evaluated subjective image quality (IQ) and diagnostic confidence (DC). Time-to-diagnosis (TTD) was recorded on VMI and IOI datasets with the highest IQ and DC and s-120-kVp dataset. One-way ANOVA and Kruskal-Wallis/Wilcoxon rank sign tests were used for statistical analysis.

RESULTS

There was a significant increase in absolute attenuation difference between normal and ischemic bowel in 40, 50, 60 keV datasets (mean±SD 66±5.3, 62±4.3, 54±5.5 HU) compared to s-120-kVp (38±5.6HU). Both readers deemed 50-keV as the best VMI dataset for subjective IQ including image sharpness and resolution (p= 0.0017), DC (p= 0.0003). IOI-50% demonstrated subjective IQ (p= 0.0021) and DC (p= 0.0041). TTD for 50-keV, IOI -50%, and s-120-kvp datasets resulted 37±4 seconds (sec), 39±10 sec, 107±7 sec).

CONCLUSION

Low energy imaging (50-keV) and color-coded IOI (50% saturation) significantly improved bowel wall conspicuity with increased attenuation differences and higher diagnostic confidence between ischemic and non-ischemic bowel compared to simulated 120-kVp. In addition, 50 keV and 50% IOI datasets allowed shorter TTD.

CLINICAL RELEVANCE/APPLICATION

Hypoperfused bowel often goes unrecognized especially for short ischemic segments that blend in with normal bowel loops. Low monoenergetic images and color-coded overlay iodine maps increase bowel wall attenuation differences improving hypoenhanced bowel segments identification.

RC308-09 Dual-Energy CT in Evaluating the Acute Bowel in Emergency: A Real Diagnostic Gain?

Tuesday, Dec. 3 11:00AM - 11:10AM Room: S401CD

Participants
Luca Tarotto, Napoli, Italy (*Presenter*) Nothing to Disclose
Igino Simonetti, MD, Naples, Italy (*Abstract Co-Author*) Nothing to Disclose
Francesco Palumbo, MD, Napoli, Italy (*Abstract Co-Author*) Nothing to Disclose
Luigi Palumbo, MD, Pozzuoli, Italy (*Abstract Co-Author*) Nothing to Disclose
Alfonso Ragozzino, Pozzuoli, Italy (*Abstract Co-Author*) Nothing to Disclose
Stefania Romano, MD, Pozzuoli, Italy (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

stefromano@libero.it

PURPOSE

Purpose of the study was to retrospectively analyze the processed imaging findings from the Dual Energy CT examinations of patients with acute abdominal symptoms compared with the native axial and multiplanar reconstructions in evaluating the cause of disease.

METHOD AND MATERIALS

A retrospective analysis on 122 patients who underwent DECT examination in emergency for acute abdominal symptoms were considered. All examinations were performed using a dual energy dual source CT 128 detector rows scanner (Drive, Siemens), after administration of i.v. contrast medium (Iomeron 400, Bracco) with mono or double phase acquisition. Native and processed images (i.e. iodine map, fusion series, virtual non contrast) were analysed in evaluation of: mesenteric vessels opacification of major and secundary branches; bowel wall thickening; bowel wall enhancement; abdominal addictional findings (free peritoneal air and fluid, mesenteric stranding, bowel lumen dilatation). Double readers / blinded final diagnosis analysis were performed; a cross-check of imaging and surgical/endoscopic from both native and processed images were made.

RESULTS

In 94/122 patients a correct diagnosis with correlative native imaging findings have been noted. In 39 patients in which the native images were already effective, post processed imaging findings did not add any new informations, whereas among the 28 patients with inconclusive findings at the native scans regarding the final diagnosis, processed images (iodine map) seemed to show altered findings, most of them in inflammatory and ischemic bowel disease.

CONCLUSION

DECT could be of help in case of controversial and not defined imaging findings , but the relative absolu value of the iodine map in evaluating the bowel wall trophism seemed to be reconsidered.

CLINICAL RELEVANCE/APPLICATION

Clinical relevance of this study is mainly pertinent on the DECT in evaluating the bowel wall enhancement in acute conditions

RC308-10 Abdominopelvic Imaging in the Emergency Department of Patients Treated with Immune Checkpoint Inhibitors: A Single Institute 9-Year Experience

Tuesday, Dec. 3 11:10AM - 11:20AM Room: S401CD

Participants
Ezgi Guler, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Sreeharsha Tirumani, MBBS, MD, Beachwood, OH (*Abstract Co-Author*) Nothing to Disclose
Daniel A. Smith, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Christopher Hoimes, DO, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Nikhil H. Ramaiya, MD, Shaker Heights, OH (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

gulerezgi@yahoo.com

PURPOSE

To evaluate abdominopelvic imaging findings of cancer patients treated with immune checkpoint inhibitors (ICIs) who presented to the emergency department (ED).

METHOD AND MATERIALS

A retrospective database search was performed to identify patients treated with ICIs who presented to the ED and underwent abdominopelvic imaging between January 2010 and November 2018. Images were reviewed to assess tumor burden and to detect immune-related adverse events (irAEs). Clinical indications for imaging and management were documented from medical record.

RESULTS

A hundred patients (62 men, median age: 63 years) with 138 abdominopelvic exams including 123 CT scans, 9 X-rays, 5 US, and 1 HIDA exams were identified. The most common cancer types included lung (40%), melanoma (17%), and kidney (12%). The date of ED visit occurred a median of 70 days after starting ICI (IQR 75-25 139-31). Common imaging indications included abdominal pain (72%), constipation (5%), and hematuria (5%). Forty-nine (35%) ED abdominopelvic scans showed worsening tumor burden at a median of 42 days (IQR 75-25 92-22) following initiation of ICIs. Twenty-five (18%) scans detected a cause of acute abdomen in patients treated with ICIs. In 5 (4%) exams, both an etiology of acute abdomen and worsening tumor burden were identified. Ten (10%) out of 100 patients demonstrated an irAE at a median of 74 days (IQR 75-25 284-42) following initial dose of ICI. irAEs detected on imaging included colitis/enteritis (6/10), pneumatosis coli (2/10), acute hepatitis (1/10), and acute acalculous cholecystitis (1/10). Steroid therapy was started in 2 cases following ICI discontinuation. The other most common causes of acute abdomen included gastrointestinal tract emergencies (10/100), and collections/abscesses (5/100).

CONCLUSION

Thirty-five percent of abdominopelvic imaging of patients on ICI therapy who presented to the ED demonstrated worsening tumor

Thirty-five percent of abdominopelvic imaging of patients on ICI therapy who presented to the ED demonstrated worsening tumor burden. Abdominopelvic irAEs were detected on imaging in 10% of patients and colitis/enteritis was the most common irAE.

CLINICAL RELEVANCE/APPLICATION

Abdominopelvic imaging at the ED detected the etiology of clinical presentation in 57% of patients treated with ICIs.

RC308-11 Clinical Use and Value of Renal Ultrasound for Suspected Urolithiasis in the Emergency Department

Tuesday, Dec. 3 11:20AM - 11:30AM Room: S401CD

Awards
Trainee Research Prize - Medical Student

Participants
Camilo Campo, Boston, MA (*Presenter*) Nothing to Disclose
Jennifer W. Uyeda, MD, Boston, MA (*Abstract Co-Author*) Consultant, Allena Pharmaceuticals, Inc
Aaron D. Sodickson, MD,PhD, Boston, MA (*Abstract Co-Author*) Institutional research agreement, Siemens AG; Speaker, Siemens AG; Speaker, General Electric Company

For information about this presentation, contact:

camilo_campo@hms.harvard.edu

PURPOSE

Computed tomography (CT) has the highest sensitivity and specificity for urolithiasis in patients with acute flank pain. However, studies have suggested that ultrasound (US) should be the initial imaging test in the Emergency Department (ED) for acute flank pain. The purpose of this study is to assess the value of renal US in predicting follow-up imaging for patients with acute flank pain and to calculate the additional time required to obtain a renal US prior to CT.

METHOD AND MATERIALS

This was an IRB-approved, HIPAA-compliant retrospective study of all patients that underwent renal US in the ED from March 2018-March 2019 for acute flank pain. Data points collected were: presence of calculi and/or hydronephrosis on US, whether patients underwent follow-up imaging within 24 hours of US, presence of calculi and/or hydronephrosis on follow-up imaging, acute extra-renal findings, need for intervention, and history of urolithiasis. The time interval between US and follow-up CT was recorded based on the time that the tests were ordered.

RESULTS

271 patients underwent renal US in the ED for acute flank pain. 76 of 271 patients (28%) underwent follow-up imaging within 24 hours of initial US: 72 underwent CT abdomen/pelvis and 4 underwent magnetic resonance urogram (MR). Of the initial 271 US, 138 (51%) were positive for calculi and/or hydronephrosis on US. Of the 76 patients who underwent follow-up CT or MR, 40 (52%) had been positive for calculi and/or hydronephrosis on initial US and 36 (47%) had been negative on US. Of the 76 that underwent follow-up imaging, 10 had acute extra-renal findings, and 17 had subsequent intervention. For patients that underwent follow-up CT, the mean time interval between US and CT was 170 min.

CONCLUSION

Few cases of acute flank pain underwent follow-up imaging. Of these, approximately half had a positive US (54%) and half had a negative US (47%). Therefore, it is likely that clinical judgement plays a large role in predicting the need for follow-up imaging. We also found a larger time interval between US and follow-up CT for patients with positive versus negative US, which may reflect that patients with positive US were given the opportunity to pass the stones before follow-up imaging.

CLINICAL RELEVANCE/APPLICATION

Renal US is often the initial test done in the ED for acute flank pain. We evaluate how renal US predicts follow-up imaging and the additional time required to obtain a renal US prior to CT.

RC308-12 Imaging of Renal Emergencies

Tuesday, Dec. 3 11:30AM - 12:00PM Room: S401CD

Participants
John J. Hines JR, MD, Huntington, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

jhines@northwell.edu

LEARNING OBJECTIVES

1) Identify acute and emergent conditions of the kidney, with emphasis on renal obstruction, infection and hemorrhage. 2) Discuss cross-sectional imaging findings typically found with acute kidney disease, with an emphasis on CT. 3) Explain how the radiologist can integrate imaging findings with clinical history in order to help guide management of the patient with acute kidney disease.

RC309

Gastrointestinal Series: Advances in Abdominal Imaging

Tuesday, Dec. 3 8:30AM - 12:00PM Room: S405AB

CT GI

AMA PRA Category 1 Credits ™: 3.00
ARRT Category A+ Credits: 4.00

FDA Discussions may include off-label uses.

Participants
Amy K. Hara, MD, Scottsdale, AZ (*Moderator*) Nothing to Disclose
George L. Shih, MD, New York, NY (*Moderator*) Consultant, MD.ai, Inc; Stockholder, MD.ai, Inc;
Avinash R. Kambadakone, MD, Boston, MA (*Moderator*) Research Grant, General Electric Company; Research Grant, Koninklijke Philips NV
Benjamin M. Yeh, MD, Hillsborough, CA (*Moderator*) Research Grant, General Electric Company; Consultant, General Electric Company; Author with royalties, Oxford University Press; Shareholder, Nextrast, Inc; Research Grant, Koninklijke Philips NV; Research Grant, Guerbet SA; ;

For information about this presentation, contact:

akambadakone@mgh.harvard.edu

Sub-Events

RC309-01 Artificial Intelligence: What You Can Use Now

Tuesday, Dec. 3 8:30AM - 8:50AM Room: S405AB

Participants
George L. Shih, MD, New York, NY (*Presenter*) Consultant, MD.ai, Inc; Stockholder, MD.ai, Inc;

RC309-02 Machine-Learning Analysis of Radiomic Features for the Preoperative Assessment of Vascular Involvement in Patients with Pancreatic Ductal Adenocarcinoma

Tuesday, Dec. 3 8:50AM - 9:00AM Room: S405AB

Participants
Francesca Rigiroli, MD, Durham, NC (*Presenter*) Nothing to Disclose
Jocelyn Hoye, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Cai Li, PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Mathias Meyer, Mannheim, Germany (*Abstract Co-Author*) Researcher, Siemens AG; Researcher, Bracco Group
Juan Carlos Ramirez-Giraldo, PhD, Cary, NC (*Abstract Co-Author*) Employee, Siemens AG
Peijie Lyu, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Niharika Mettu, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Sabino Zani JR, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Sheng Luo, PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Ehsan Samei, PhD, Durham, NC (*Abstract Co-Author*) Research Grant, General Electric Company Research Grant, Siemens AG Advisory Board, medInt Holdings, LLC License agreement, 12 Sigma Technologies License agreement, Gammex, Inc
Daniele Marin, MD, Durham, NC (*Abstract Co-Author*) Research support, General Electric Company

For information about this presentation, contact:

francesca.rigiroli@duke.edu

PURPOSE

To evaluate the performance of radiomic features analysis in the pre-operative assessment of superior mesenteric artery (SMA) involvement in patients with pancreatic ductal adenocarcinoma (PDA).

METHOD AND MATERIALS

104 patients with surgically-proven PDA were identified between 2013 and 2018. 80% of patients underwent neoadjuvant therapy. All patients underwent dedicated preoperative pancreatic CT (range, 3 to 105 days before surgery). As part of the standard of care, images were reviewed by a panel of experts from radiology, surgery, and medical oncology. Patients were categorized as resectable, borderline resectable, or locally advanced according to recent NCCN guidelines. Subsequently, we performed a volumetric segmentation of the primary tumor and the circumferential perivascular tissue surrounding the SMA (2.5 to 4.5-mm in diameter) using a prototype segmentation and radiomic features extraction software (Radiomics, Siemens Healthineers). Extracted features included standard intensity, size, shape, and texture properties. In addition, composite radiomic features were calculated accounting for the spatial relationships and texture features similarities between the primary tumor and the perivascular tissue. A machine learning random forest model based on radiomic features was developed and validated by 100-times cross validation for the prediction of SMA tumor involvement. Pathologic R stage of the SMA margin after surgery was used as the reference standard.

RESULTS

9 standard and 2 composite features were identified as significant predictors of SMA involvement by PDA. The diagnostic

performance of the machine learning model was substantially higher compared to the consensus visual assessment of the expert panel (average area under the curve,AUC: 0.84 vs. 0.66). This improvement was largely related to selecting informative radiomincs features by using machine learning methods (Figure).

CONCLUSION

Our study suggests that machine learning analysis of radiomic features improves the accuracy of preoperative SMA staging in patients with PDA.

CLINICAL RELEVANCE/APPLICATION

Machine learning analysis of radiomic features may provide important information for pre-operative assessment of SMA involvement in patients with PDA, which may imrpove patient selection for surgery.

RC309-03 Low-dose CT Update

Tuesday, Dec. 3 9:00AM - 9:20AM Room: S405AB

Participants
Amy K. Hara, MD, Scottsdale, AZ (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

hara.amy@mayo.edu

LEARNING OBJECTIVES

1) Recognize opportunities for reducing CT radiation dose (primarily for body imaging). 2) Be familiar with current and cutting edge CT dose reduction techniques.

Active Handout:Amy Kiyo Hara

http://abstract.rsna.org/uploads/2019/19000861/Active RC309-03.pdf

RC309-04 Potential of an Image-Based Frequency-Splitting Multiband Filtration Denoising Algorithm to Reduce Radiation by 50% for Multiphase Liver CT: Impact on Metastasis Detection Potential of Image-Based Frequency-Splitting Multiband Filtration Denoising

Tuesday, Dec. 3 9:20AM - 9:30AM Room: S405AB

Participants
Benjamin Voss, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose
Eric C. Ehman, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Jay P. Heiken, MD, Rochester, MN (*Abstract Co-Author*) Patent agreement, Guerbet SA; Patent agreement, Bayer AG
Nam Ju Lee, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Matthias Baer, DiplPhys, Erlangen, Germany (*Abstract Co-Author*) Nothing to Disclose
Akitoshi Inoue, MD,PhD, Higashioumi, Japan (*Abstract Co-Author*) Nothing to Disclose
Rogerio Vasconcelos, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Gregory J. Michalak, PhD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Rickey E. Carter, PhD, Jacksonville, FL (*Abstract Co-Author*) Nothing to Disclose
Matthew Johnson, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Yong Lee, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Ahmed Halaweish, PhD, Rochester, MN (*Abstract Co-Author*) Employee, Siemens AG
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; Consultant, Medtronic plc; Consultant, Takeda Pharmaceutical Company Limited; Grant, Takeda Pharmaceutical Company Limited; ;

For information about this presentation, contact:

fletcher.joel@mayo.edu

PURPOSE

Image-based frequency split multiband filtration denoising (FS-MBF) uses images from one phase of enhancement to help reduce CT image noise in other phases. Our purpose is to determine if FS-MBF can be used to reduce image noise for half dose multiphase liver CT without sacrificing the ability to detect subtle hepatic metastases.

METHOD AND MATERIALS

All patients had archived projection CT data from contrast-enhanced multiphase liver CT. Metastases were confirmed with histology, or progression or regression, with benign lesions confirmed with stability. Half dose CT images were created using a validated noise insertion program, then reconstructed with FS-MBF. Anonymized routine or half dose FS-MBF images were evaluated by two radiologists in two sessions, with each patient's exam evaluated once/session. Radiologists reviewed images, noting location of liver lesions, rating confidence in liver metastasis presence on a per lesion and per patient level (0-100 scale), and assigning scores for image quality. A confidence cutoff of 10 was used for sensitivity and specificity comparisons.

RESULTS

48 patients had 141 liver lesions (61 mets [size1.2 cm±0.9 cm], 80 benign lesions). CTDIvol was 20± 8 mGy/phase. Per metastasis sensitivity was similar between routine dose and half dose FS-MBF multiphase CT (R1 - 81% v. 77%, p= 0.3; R2 - 80 v. 77%, p = 0.4). Per patient accuracy was also similar for each radiologist (R1- 67.0% v. 63.0%; R2 - 74.0% v. 77.0%, p=0.098 - 0.34). For patients with metastases, patient level confidence that liver metastases were present was not different for either reader between routine and half dose FS-MBF exams (R1 - mean 74 v. 85; p = 0.26; R2 - mean 69 v. 71, p = 0.65). Patient level confidence scores in patients without metastases were also similar (p = 0.26, 0.65). The mean image quality of half dose FS-MBF images was slightly but significantly lower (SD 4.4 ± 0.7 v. 4.0 ± 0.8, p = 0.0001).

CONCLUSION

Radiologist performance for detection of hepatic metastases using half dose FS-MBF multiphase liver exams was similar to routine dose, providing a new image-based method to reduce image noise for multiphase CT exams.

CLINICAL RELEVANCE/APPLICATION

An image-based method for reducing image noise for multiphase, contrast-enhanced abdominal CT shows promise as a broadly applicable noise reduction method that preserves radiologist performance at half of routine radiation dose.

RC309-05 Effects of Deep Learning Reconstruction (DLR) and Iterative Reconstruction Techniques on Sub-Milli-Sievert Chest and Abdomen-Pelvis CT: Image Quality and Lesion Detection

Tuesday, Dec. 3 9:30AM - 9:40AM Room: S405AB

Participants
Ramandeep Singh, MBBS, Boston, MA (*Presenter*) Nothing to Disclose
Yiemeng Hoi, PhD, Tustin, CA (*Abstract Co-Author*) Employee, Canon Medical Systems Corporation
Erin Angel, PhD, Tustin, CA (*Abstract Co-Author*) Employee, Canon Medical Systems Corporation
Avinash R. Kambadakone, MD, Boston, MA (*Abstract Co-Author*) Research Grant, General Electric Company; Research Grant, Koninklijke Philips NV
Subba R. Digumarthy, MD, Boston, MA (*Abstract Co-Author*) Speaker, Siemens AG; Research Grant, Lunit Inc; Researcher, Merck & Co, Inc; Researcher, Pfizer Inc; Researcher, Bristol-Myers Squibb Company; Researcher, Novartis AG; Researcher, F. Hoffmann-La Roche Ltd; Researcher, Polaris Pharmaceuticals, Inc; Researcher, Cascadia Healthcare, LLC; Researcher, AbbVie Inc; Researcher, Gradalis, Inc; Researcher, Clinical Bay; Researcher, Zai Lab
Mannudeep K. Kalra, MD, Lexington, MA (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, Riverain Technologies, LLC;
Victorine V. Muse, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Michael A. Blake, MBBCh, Milton, MA (*Abstract Co-Author*) Nothing to Disclose
Naruomi Akino, Otawara, Japan (*Abstract Co-Author*) Employee, Canon Medical Systems Corporation

For information about this presentation, contact:

rsingh17@mgh.harvard.edu

PURPOSE

To compare image quality and lesion detection of Deep Learning Reconstruction (DLR) and Iterative Reconstruction (IR) on sub-milli-Sievert chest and abdomen-pelvis CT.

METHOD AND MATERIALS

Our study included 59 adult patients (33F:26M; age=65±12 years, BMI=27±5 kg/m2) who underwent routine chest (n=22;16F: 6M) and abdomen (n=37;17F: 20M) CT on a 640-slice MDCT (Aquilion ONE, Canon Medical Systems). All patients gave written informed consent for acquisition of low dose (LD) CT after a clinically indicated standard dose (SD) CT. The SD-CT (120kVp;164-644mAs) were reconstructed with AIDR3D (IR) and the LD-CT (100,120kVp;30-50mAs) were reconstructed with FBP, IR (AIDR3D, FIRST) and DLR. Four sub-specialty trained radiologists (R1, R2-thoracic; R3, R4-abdominal) performed subjective evaluation for chest (2mm; kernel FC18) and abdomen (2mm; kernel FC52) image sets on a four-point scale (1 = unacceptable image quality; 4 = image quality better than SD). Lesions were first detected on LD-FBP. LD (FIRST, AIDR3D, DLR) images were then compared side-by-side to SD (AIDR3D) images in an independent, randomized, and blinded fashion. Descriptive statistics and Wilcoxon sign rank test were performed.

RESULTS

CTDIvol and DLP for LD-CT (2.1±0.8mGy; 49±13mGy-cm) were lower than SD-CT (13±4.4mGy;567±249mGy.cm) ($p<0.0001$). All 31 clinically significant lesions (such as 13 liver lesions, 5 adrenal nodules, 8 retroperitoneal nodes, 3 pancreatic lesions) were detected on SD-CT and LD-DLR. LD-AIDR3D, LD-FIRST and LD-FBP detected 25/31, 18/31, and 7/31 lesions, respectively. For chest CT, 33/39 nodules detected on LD-DLR and SD-CT were missed on LD-FBP. LD-DLR was deemed acceptable for interpretation (median score >=3) in 97% of LD abdomen and 95-100% (R1-R2s scores) of LD chest ($p=0.2-0.99$). LD-FBP was unacceptable for all patients (59/59) whereas LD-FIRST had unacceptable image quality in 36-39% cases ($p<0.0001$). LD-AIDR3D images were unacceptable in 11-49% abdomen-pelvis CT (4/37-18/37; $p<0.04-0.0001$) and 41-45% chest CT (9/22-10/22; $p=0.002-0.003$).

CONCLUSION

At sub-milli-Sievert chest and abdomen-pelvis CT doses, DLR enables superior image quality and lesion detection as compared to commercial IR and FBP images.

CLINICAL RELEVANCE/APPLICATION

Deep Learning based Reconstruction (DLR) in CT outperforms commercial iterative reconstruction techniques and provides acceptable diagnostic quality for routine chest and abdomen-pelvis CT examinations at sub-milli-Sievert radiation dose levels.

RC309-06 Oral Contrast Media Controversies for CT and MR

Tuesday, Dec. 3 9:40AM - 10:00AM Room: S405AB

Participants
Avinash R. Kambadakone, MD, Boston, MA (*Presenter*) Research Grant, General Electric Company; Research Grant, Koninklijke Philips NV

For information about this presentation, contact:

akambadakone@mgh.harvard.edu

LEARNING OBJECTIVES

1) Explain the indications and benefits of oral contrast media in abdomen/pelvis CT. 2) Understand the controversies in the role of

oral contrast media in various clinical settings including ER, oncology and routine abdominal scans. 3) Learn the role of oral contrast media in abdominal MRI, its benefits and controversies. 4) Optimize the use of oral contrast media to improve diagnosis.

RC309-07 New Applications of Dual-energy CT

Tuesday, Dec. 3 10:30AM - 10:50AM Room: S405AB

Participants
Benjamin M. Yeh, MD, Hillsborough, CA (*Presenter*) Research Grant, General Electric Company; Consultant, General Electric Company; Author with royalties, Oxford University Press; Shareholder, Nextrast, Inc; Research Grant, Koninklijike Philips NV; Research Grant, Guerbet SA; ;

For information about this presentation, contact:

ben.yeh@ucsf.edu

LEARNING OBJECTIVES

1) Describe potential applications of dual energy CT image reconstructions to improve clinical diagnoses. 2) Apply dual energy CT to clarify the cause of ambiguous radiodensities. 3) Examine the methods by which dual energy CT may allow 'invisible' lesions to be better seen. 4) List ways that different dual energy CT image reconstructions can be used to minimize artifacts at CT imaging. 5) Describe potential challenges and benefits of new dual energy CT techniques for clinical decision making.

RC309-08 Value of Dual-Energy CT Imaging for Evaluation of Intestinal Activity and Severity in Crohn's Disease

Tuesday, Dec. 3 10:50AM - 11:00AM Room: S405AB

Participants
Yu Zhang, MS, Wuhan, China (*Abstract Co-Author*) Nothing to Disclose
Ming Yang, Wuhan, China (*Abstract Co-Author*) Nothing to Disclose
Xin Li, MD,PhD, Wuhan, China (*Presenter*) Nothing to Disclose
Ping Han, MD, Wuhan, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the clinical value of dual-energy CT imaging in assessing the activity and severity of Crohn's disease compared with the simple endoscopic score (SES).

METHOD AND MATERIALS

60 patients suspected to have Crohn's disease received both colonoscopy and dual-energy computed tomography (DECT) were involved in this study. The interval time between the two examinations was less than one week. All examinations were performed on the same dual-energy DECT scanner (SOMATOM Force, Siemens) with standardized settings for the DECT mode: tube A: 90 kV; tube B: Sn150 kV with tin filter. Dedicated software (syngo.via) with an iodine subtraction algorithm was used to calculate quantitative CT data from portal-venous phase images, including iodine concentration and fat fraction measurements. According to the Simple Endoscopic Score for Crohn's Disease(SES-CD), 60 patients were divided into 4 groups(GroupA:Score=0-2,n=8;GroupB:Score=3-6,n=14;GroupC:Score=7-15,n=22;GroupD:Score>=16,n=16). Each patient's ROI measurements were repeated nine times and mean values were taken into account. Mean values of the iodine concentration of lesions and surrounding adipose tissue, the fat fraction of lesions and surrounding adipose tissue were used for the evaluation.

RESULTS

The iodine concentration of lesions(0.87±0.45, 0.99±0.36, 1.17±0.55, 1.94±0.54), the iodine concentration of surrounding adipose tissue(0.23±0.09, 0.42±0.10,0.66±0.11,1.56±0.29), the fat fraction of lesions(27.34±2.34,25.55±1.33,15.64±2.91,10.36±2.71)and the fat fraction of surrounding adipose tissue(90.52±5.04, 85.31±4.06, 71.35±5.34, 63.74±4.84)of four groups were found statistically significant different ($P<0.01$); the iodine concentration of lesions and surrounding adipose tissue among Group A, Group C and Group D were statistically different($P<0.05$); the fat fraction of lesions and surrounding adipose tissue among Group B,Group C and Group D were statistically different($P<0.05$).

CONCLUSION

The iodine concentration and the fat fraction derived from dual-energy CT imaging can be used to evaluate the activity and severity of Crohn's disease.

CLINICAL RELEVANCE/APPLICATION

dual-energy CT had sensitivity in detecting intestinal activity and severity of CD, which could be an alternative choice in evaluation of CD. The ultimate purpose of this study was to establish the standards of evaluating the activity of Crohn's disease using dual-energy CT in the future.

RC309-09 Role of Dual-Energy Computed Tomography in the Evaluation of Liver Fibrosis in Patients of Chronic Liver Disease

Tuesday, Dec. 3 11:00AM - 11:10AM Room: S405AB

Awards
Trainee Research Prize - Resident

Participants
Uday K. Marri, MBBS,MD, Delhi , India (*Presenter*) Nothing to Disclose
Shalimar Shalimar, MBBS,MD, Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Prasenjit Das, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Deepnarayan Srivastava, Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Raju Sharma, MD, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Madhusudhan Kumble Seetharama, MD, FRCR, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

CHINNA.7777777@YAHOO.IN

PURPOSE

To quantify liver fibrosis in patients of chronic liver disease (CLD) using delayed phase dual-energy computed tomography (DECT) and comparing it with liver elastography and histology.

METHOD AND MATERIALS

107 patients (57 men; 50 women, mean age-35.4yrs) of CLD due to various aetiologies were included in this approved prospective study. 50 voluntary kidney donors undergoing multiphasic CT abdomen were used as controls. All patients underwent Transient elastography (TE), Shear wave elastography (SWE), multiphasic DECT (arterial, portal venous and 5 min delayed) and liver biopsy, whereas multiphasic DECT and SWE were performed in controls. Regions of interest were drawn on both lobes of liver and aorta on the 5-min delayed DECT scan to calculate the normalized iodine concentration (NIC=Iodine concentration in the liver/concentration in the aorta) and slope of the monochromatic spectral curve [(HU at 40keV - HU at 70keV)/30]. These were compared with liver stiffness (LS) on TE and SWE and the pathological METAVIR stage (F0 to F4) and collagen proportionate area (CPA). The accuracy of each parameter in quantifying liver fibrosis was assessed using receiver operating characteristic (ROC) curve.

RESULTS

The NIC of liver in cases showed high positive correlation with METAVIR staging and CPA (r= 0.810 and 0.665 respectively; p<0.0001). Area under ROC curve for NIC with each METAVIR stage ranged between 0.860 and 0.961. The cut-off values (with sensitivity and specificity) of NIC for different fibrosis stages were: >=F1 = 0.243 (85.1%, 83.3%), >=F2 = 0.289 (83.7%, 81.4%), >=F3 = 0.343 (86.9%, 86.8%), =F4 = 0.401 (93.3%, 84.7%), respectively. The mean NIC of liver in controls was 0.233. Spectral curve slope in cases showed poor correlation with histology (r= 0.265, p<0.006). The NIC of right lobe showed moderate agreement with LS measured by TE and SWE (r =0.599 and 0.635 respectively, p<0.0001). The LS on TE and SWE in cases showed good correlation with METAVIR stage [r= 0.704 and 0.736 respectively; p<0.0001].

CONCLUSION

The NIC of the liver on delayed phase DECT is accurate in non-invasive quantification of liver fibrosis and is better than liver elastography.

CLINICAL RELEVANCE/APPLICATION

Biopsy or elastography cannot quantify fibrosis of the entire liver. The delayed phase DECT is promising in assessing liver fibrosis and may become a one-stop shop for evaluating patients with CLD.

RC309-10 Comparison between ROI-Based and Volumetric Measurements of Liver Fibrosis Using MR Elastography in Quantifying Heterogeneity of Liver Stiffness

Tuesday, Dec. 3 11:10AM - 11:20AM Room: S405AB

Participants
Roya Rezvani Habibabadi, Baltimore, MD (*Presenter*) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Sanaz Ameli, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

rrezvan3@jhmi.edu

PURPOSE

To compare ROI-based and volumetric measurements in quantifying heterogeneity of liver stiffness (LS) using MRE.

METHOD AND MATERIALS

In this retrospective, IRB approved study, 128 patients with suspected liver fibrosis and MRE were reviewed between 12/2016 and 12/2017. LS was measured using: 1) the average of 3 Regions of interest (ROI), and 2) volumetric segmentation of the entire liver parenchyma (excluding vessels) using a semi-automatic software. Mean LS (MLS) of the 2 methods was calculated for each patient. Stages of fibrosis were defined using previously tested thresholds. Each patient was assigned to one of the 5 stages of fibrosis (MLS-stage)based on their ROI-MLS. Volumetric measurement of stiffness maps was also used to calculate the full range of LS and percentage involvement of the liver with each stage of fibrosis. Accordingly, specific proportions were defined: 1) above MLS-stage: percentage of the liver that has LS at least one category higher than MLS-stage, and 2) the first and second most predominant stages of fibrosis. Heterogeneous stiffness was defined when the first and second most predominant stages were more than one category apart.

RESULTS

The mean age of patients was 54 ±15 years; 46% were female. The average of MLS was 2.72 ±1.03 kPa for ROI measurements and2.64 ±0.93 kPafor volumetric method (p=0.001).As per MLS-stage,59 (46 %), 19 (15 %), 13 (10 %), 26 (20%) and 11 (8%) patients were assigned to stages F0, F1, F2, F3, and F4.In 58 patients (45%), more than 20% of liver had stiffness at least one stage higher than MLS-stage. Among 59 patients with normal MLS-stage (F0), 31 patients (53%) had >20% of liver volume with abnormal LS (F1-F4). In all 128 patients, an average of 20% of the liver volume had stiffness at least one stage higher than each individuals' MLS-stage. By definition,18 patients (14%) were identified to have heterogeneous stiffness.

CONCLUSION

Heterogeneity of hepatic fibrosis may occur in patients with chronic liver disease. MLS may not represent the entire spectrum of hepatic fibrosis. Failure to detect heterogeneity in its early stage could cause a delay in treatment initiation and progression of fibrosis.

CLINICAL RELEVANCE/APPLICATION

Volumetric segmentation and descriptive reporting of LS can potentially improve the detection of heterogeneous fibrosis in the liver and the accuracy of LS measurement. It helps to establish a more timely and precise management plan for each patient.

RC309-11 Dual-Layer Spectral CT of Pancreatic Adenocarcinoma: Can Virtual Monoenergetic Imaging of Portal Venous Phase Replace Pancreatic Phase?

Tuesday, Dec. 3 11:20AM - 11:30AM Room: S405AB

Participants
Beom Jin Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yeo Eun Han, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Min-Ju Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Na Yeon Han, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ki Choon Sim, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyun Jin Kim, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Deuk Jae Sung, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sung Bum Cho, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yeonny0714@naver.com

PURPOSE

To evaluate diagnostic performance and optimal keV of virtual monoenergetic imaging (VMI) created from portal venous phase in comparison with conventional 120kVp polychromatic imaging of pancreatic phase on dual-layer spectral CT when assessing pancreatic adenocarcinoma and peripancreatic vasculature.

METHOD AND MATERIALS

In this retrospective study, thirty patients with pancreatic adenocarcinoma who underwent dual-layer spectral CT scan with nonenhanced images, pancreatic phase, and portal venous phase were included. VMIs for 40 keV (VMI40), 55 keV (VMI55), and 70 keV (VMI70) of portal venous phase were created, and each VMI was compared with conventional 120kVp polychromatic imaging of pancreatic phase. In all four images, tumor-to-pancreas contrast-to-noise ratio (CNR) and attenuation difference were compared for tumor conspicuity. CNR and signal-to-noise ratio (SNR) of the celiac trunk, superior mesenteric artery, portal vein, and superior mesenteric vein were compared for peripancreatic vasculature assessment. Effective radiation dose for standard triple-phase and dual-phase without pancreatic phase CT scan were compared.

RESULTS

VMI40 of portal venous phase demonstrated significantly the greatest ($P < 0.001$) tumor-to-pancreas CNR and attenuation difference, peripancreatic vascular CNR and SNR than those of conventional pancreatic phase and VMI55, VMI70 of portal venous phase. VMI55 of portal venous phase demonstrated second greatest ($P < 0.001$) results in all measured values. VMI70 of portal phase and conventional pancreatic phase were equivalent in tumor-to-pancreas attenuation difference and CNR of arteries (celiac trunk and superior mesenteric artery). Mean effective dose was 12.8±3.9 mSv and 8.9±2.7 mSv for standard triple-phase CT scan and dual-phase CT scan without pancreatic phase, respectively.

CONCLUSION

For assessing pancreatic adenocarcinoma, VMI40 of portal venous phase obtained on dual-layer spectral CT demonstrated superior tumor conspicuity, higher CNR and SNR for peripancreatic vasculature than those of conventional pancreatic phase.

CLINICAL RELEVANCE/APPLICATION

VMI40 of portal venous phase may replace conventional pancreatic phase with better diagnostic performance and reduced radiation dose. Further study in greater population may be required.

RC309-13 Advances in Molecular Imaging for the Abdomen

Tuesday, Dec. 3 11:40AM - 12:00PM Room: S405AB

Participants
Thomas A. Hope, MD, San Francisco, CA (*Presenter*) Research Grant, General Electric Company; Research Grant, Koninklijke Philips NV; Advisory Board, Ipsen SA; Researcher, Advanced Accelerator Applications SA

For information about this presentation, contact:

thomas.hope@ucsf.edu

LEARNING OBJECTIVES

1) Identify approved imaging agents for prostate cancer. 2) Describe the role of somatostatin receptor PET agents for staging neuroendocrine tumor. 3) Assess the limitations and opportunities of molecular imaging moving forward.

RC311

Review of Pediatric Nuclear Medicine

Tuesday, Dec. 3 8:30AM - 10:00AM Room: S504CD

GI GU MK NM PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

LEARNING OBJECTIVES

1) Review of Pediatric Nuclear medicine, particularly for radiologists and nuclear medicine physicians who may not specialize in pediatric patients, and for resident and fellow trainees.

Sub-Events

RC311A Pediatric Gastrointestinal

Participants
Helen R. Nadel, MD, Palo Alto, CA (*Presenter*) Consultant, ICON plc

For information about this presentation, contact:

hnadel@stanford.edu

LEARNING OBJECTIVES

1) Be able to list indications for GI scintigraphy in children. 2) Be able to describe scintigraphic patterns of disease on GI examinations in children.

RC311B Pediatric Genitourinary

Participants
Neha S. Kwatra, MBBS, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

neha.kwatra@childrens.harvard.edu

LEARNING OBJECTIVES

1) Describe pediatric renal diseases and understand the complementary role of scintigraphy and other imaging modalities. 2) Apply pediatric-specific imaging considerations. 3) Identify important normal variants/pitfalls in interpretation.

RC311C Pediatric Musculoskeletal

Participants
Susan E. Sharp, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be able to describe the utilization and performance of nuclear medicine imaging for musculoskeletal indications in pediatric patients. 2) Be able to identify musculoskeletal findings on Tc-99m-MDP and F-18-FDG scans.

RC311D Case Presentation/Panel Discussion

Participants
Stephan D. Voss, MD,PhD, Boston, MA (*Presenter*) Nothing to Disclose

RC329

Liver MRI Essentials (Interactive Session)

Tuesday, Dec. 3 8:30AM - 10:00AM Room: N227B

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC329A HCC: Typical and Atypical Appearances

Participants
Kathryn J. Fowler, MD, San Diego, CA (*Presenter*) Consultant, 12 Sigma Technologies; Researcher, Nuance Communications, Inc; Contractor, Midamerica Transplant Services; ;

For information about this presentation, contact:

k1fowler@ucsd.edu

LEARNING OBJECTIVES

1) Review pathological sub-types of HCC. 2) Gain knowledge of the imaging appearance of atypical HCC. 3) Understand impact on management.

RC329B Intrahepatic Cholangiocarcinoma

Participants
Sara Lewis, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify the risk factors and clinical features of intrahepatic cholangiocarcinoma (ICC). 2) Examine the cross-sectional typical and atypical imaging characteristics of ICC, with emphasis on CT and MRI. 3) Identify imaging and clinical features that aid in accurate diagnosis of ICC compared to other malignant and benign hepatic lesions.

RC329C Hilar/Perihilar Cholangiocarcinoma

Participants
Koenraad J. Mortele, MD, Boston, MA (*Presenter*) Nothing to Disclose

RC329D FNH and Hepatocellular Adenomas

Participants
Maxime Ronot, MD, Clichy, France (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

maxime.ronot@aphp.fr

LEARNING OBJECTIVES

1) To be able to recognize and non-invasively diagnose typical forms of FNH. 2) To understand the pathomolecular classification of hepatic adenomas. 3) To know how to differentiate FNH from adenomas on imaging. 4) To understand the value and pitfalls of liver-specific contrast agents.

RC329E Liver Metastases

Participants
Frank H. Miller, MD, Chicago, IL (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To be able to identify findings to identify and characterize liver lesions as metastases. 2) To use a variety of MR sequences to detect and distinguish metastases from other benign lesions such as hemangiomas.

RCA32

Understanding Anorectal and Cloacal Malformations with 3D Printed Models (Hands-on)

Tuesday, Dec. 3 10:30AM - 12:00PM Room: S401AB

GI IN

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Jayanthi Parthasarathy, BDS, PhD, Columbus, OH (*Moderator*) Nothing to Disclose
Jayanthi Parthasarathy, BDS, PhD, Columbus, OH (*Presenter*) Nothing to Disclose
Benjamin P. Thompson, DO, Columbus, OH (*Presenter*) Nothing to Disclose
D. Gregory Bates, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Mark J. Hogan, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Marc Levitt, Columbus, OH (*Presenter*) Nothing to Disclose
Devin R. Halleran, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Hira Ahmad, Columbus, OH (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Jayanthi.Parthasarathy@natiowidechildrens.org

hira.ahmad@nationwidechildrens.org

LEARNING OBJECTIVES

1) Understand imaging protocol for anorectal and cloacal malformations for creating precise 3D models. 2) Learn the process of creating patient specific 3D anatomic models of anorectal and cloacal malformations. 3) Understand the various types of anorectal and cloacal malformations using 3D Printed models and their clinical implication in surgical planning.

ABSTRACT

Anorectal and cloacal malformations are rare birth defetcs occurring 1 in 20,000 live births. Understanding the underlying pathologic anatomy in the region of interest is challenging due to varying nature of the anatomy, the complexity of the structures and their relationships, and a wide spectrum of defects. Surgical planning and prognosis depends on precise emasurements of the common channel and urethra. Precise models can be made only with protocols developed for 3D modleing. The presentation will delve in detail into the imaging procedures targeted to 3D modleing processes, for creating 3D virtual models and 3D pritning of anorectal and cloacal malformations. 3D printed models of anorecctal malformations will be used to demonstrate their utiliyy in understanding the underlying pathologic anatomy in surgical decision-making. Experts in interventional radiologists and 3D modleing and pritning will conduct the course and be available for any questions during the presentation

SSG04

Gastrointestinal (Liver Fibrosis)

Tuesday, Dec. 3 10:30AM - 12:00PM Room: E353A

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Utaroh Motosugi, MD, Chuo, Japan (*Moderator*) Nothing to Disclose
Claude B. Sirlin, MD, San Diego, CA (*Moderator*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc
Aoife Kilcoyne, MBBCh, Boston, MA (*Moderator*) Author, Wolters Kluwer nv

Sub-Events

SSG04-01 Assessing Liver Tumor Stiffness by Diffusion-Weighted MR Imaging-Based Virtual Elastography

Tuesday, Dec. 3 10:30AM - 10:40AM Room: E353A

Participants
Takashi Ota, MD,PhD, Suita, Japan (*Presenter*) Nothing to Disclose
Masatoshi Hori, MD, Muko, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiromitsu Onishi, MD, Suita, Japan (*Abstract Co-Author*) Research Grant, Canon Medical Systems Corporation
Atsushi Nakamoto, MD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Hideyuki Fukui, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Noriyuki Tomiyama, MD,PhD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazuya Ogawa, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Mitsuaki Tatsumi, MD, PhD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Recent study showed that there was a significant strong correlation between MR elastographic shear modulus (μMRE) and a shifted apparent diffusion coefficient (sADC200-1500) calculated from diffusion MR signals acquired with *b* values of 200 and 1500 sec/mm2 in the liver parenchyma. The purpose of our study was to retrospectively estimate the liver tumor stiffness by calculating sADC200-1500, comparing with MR elastography (MRE). We also compared tumor standard ADC values (ADC0-800: *b* values of 0 and 800 sec/mm2) with MRE.

METHOD AND MATERIALS

Eighty-seven patients with hepatic tumors underwent liver MR imaging at 3T (hepatocellular carcinoma [HCC], 32; metastasis, 26; hemangioma, 29). Of these, forty-five patients underwent diffusion-weighted imaging (*b* values of 200, 1500 and *b* values of 0, 800 sec/mm2) and MRE. Of forty-five patients, we measured tumor stiffness in fifteen patients (HCC, 9; metastasis, 6) who had tumors larger than 3cm by calculating μMRE, sADC200-1500 and ADC0-800 values. We also measured liver stiffness in forty-five patients by calculating μMRE, sADC200-1500 and ADC0-800 values. Finally, we measured sADC200-1500 values of hepatic tumors in eighty-seven patients. The correlation between μMRE and ADC values was evaluated using Pearson's correlation test. Receiver operating characteristic (ROC) analysis was used to evaluate the diagnostic performance of sADC200-1500 values for differentiating between benign and malignant tumors.

RESULTS

μMRE and sADC200-1500 exhibited strong correlations both for liver tumor (r=0.80; p<.001), and for liver parenchyma (r=0.87; p<.001). Meanwhile, μMRE and ADC0-800 exhibited no correlation for liver tumor (r=0.32; p=.24), and weak correlation for liver parenchyma (r=0.45; p=.002). The mean sADC200-1500 value of hemangioma was significantly higher than that of HCC and metastasis (1.69, 0.88, and 0.92×10-3mm2/sec; p<.001). A cut-off value of 1.27×10-3mm2/sec for sADC200-1500 detected with ROC analysis yielded 96.6% sensitivity and 89.5% specificity for the differentiation between benign and malignant tumors.

CONCLUSION

There was a significant strong correlation in the liver tumor between μMRE and sADC200-1500. Mean sADC200-1500 value of benign tumors was significantly higher than that of malignant tumors.

CLINICAL RELEVANCE/APPLICATION

Liver tumor stiffness estimation could be performed with DWI, and liver tumor stiffness assessment by virtual elastography facilitates the differentiation of malignant and benign liver tumors.

SSG04-02 Intravoxel Incoherent Motion Diffusion-Weighted MRI for Characterization of Diffuse Liver Disease

Tuesday, Dec. 3 10:40AM - 10:50AM Room: E353A

Participants
Thierry Lefebvre, Montreal, QC (*Presenter*) Nothing to Disclose
Melanie Hebert, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Laurent Bilodeau, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Claire Wartelle-Bladou, MD, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Giada Sebastiani, MD, Montreal, QC (*Abstract Co-Author*) Speaker, Merck & Co, Inc; Speaker, Bristol-Myers Squibb Company; Speaker, Gilead Sciences, Inc; Speaker, AbbVie Inc; Research funded, Merck & Co, Inc; Research funded, Echosens SA
Helene Castel, MD, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Damien Olivie, MD, MS, Qutremont, QC (*Abstract Co-Author*) Nothing to Disclose
Bich Nguyen, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Guillaume Gilbert, PhD, Montreal, QC (*Abstract Co-Author*) Employee, Koninklijke Philips NV
An Tang, MD, Montreal, QC (*Abstract Co-Author*) Research Consultant, Imagia Cybernetics Inc Speaker, Siemens AG Speaker, Eli Lilly and Company

For information about this presentation, contact:

an.tang@umontreal.ca

PURPOSE

To evaluate the diagnostic performance of diffusion-weighted imaging (DWI) intravoxel incoherent motion (IVIM) parameters and stretched exponential model parameters for assessing histological features in patients with chronic liver disease (CLD).

METHOD AND MATERIALS

This prospective, cross-sectional multi-center study was approved by the Institutional Review Board of the two participating institutions. Ninety patients with suspected or known CLD who underwent clinically indicated liver biopsies were recruited between January 2014 and July 2018. IVIM parameters (perfusion fraction *f*, diffusion coefficient *D*, and pseudo-diffusion coefficient *D**) and stretched exponential model parameters (intravoxel water diffusion heterogeneity *a* and distributed diffusion coefficient *DDC*) were estimated using a least-squares, non-linear regression on DWI series (10 *b* values up to 800 s/mm2). Inflammation, fibrosis, and steatosis were scored by an expert liver pathologist. Spearman's rho, Kruskal-Wallis test, Mann-Whitney U test, and receiver operating characteristic (ROC) analyses were performed. Multiple regression analysis was used to assess the effects of histological features on diffusion parameters.

RESULTS

Among all parameters and histological features, *f* and *a* showed the strongest correlation with inflammation grades (ρ = -0.57 and ρ = 0.40, respectively; $P < 0.001$). Both *f* and *a* were significantly different between all inflammation grades ($P < 0.001$) and between pairs of inflammation grades <= A1 vs >= A2 ($P < 0.001$ and $P = 0.007$, respectively). Areas under the ROC curve for distinguishing <= A1 vs >= A2 were 0.84 (95% confidence interval: 0.74-0.91) with *f* and 0.72 (0.60-0.81) with *a*. In multiple regression analysis, fibrosis had a significant impact on *f* ($P = 0.03$), but not on *a* ($P = 0.18$), while steatosis had a significant impact on *a* ($P = 0.01$), but not on *f* ($P = 0.08$). Association between inflammation and parameters *f* and *a* remained significant when including fibrosis and steatosis in the regression model ($P < 0.001$ and $P < 0.05$, respectively).

CONCLUSION

Perfusion fraction and intravoxel water diffusion heterogeneity show promise as surrogate biomarkers of liver inflammation using IVIM-DWI.

CLINICAL RELEVANCE/APPLICATION

DWI sequence with multiple b values should be performed on abdominal MR examination in patients with chronic liver disease as it could provide supplemental information on inflammatory activity within the liver.

SSG04-03 Can Single-Section, Machine Learning-Based Radiomics Differentiate Normal Liver from Diffuse Liver Diseases?

Tuesday, Dec. 3 10:50AM - 11:00AM Room: E353A

Participants
Ruhani Doda Khera, MD, Cambridge, MA (*Abstract Co-Author*) Nothing to Disclose
Fatemeh Homayounieh, MD, Boston, MA (*Presenter*) Nothing to Disclose
Ramandeep Singh, MBBS, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Felix Lades, Forchheim, Germany (*Abstract Co-Author*) Employee, Siemens AG
Andrew Primak, PhD, Cleveland, OH (*Abstract Co-Author*) Employee, Siemens AG
Subba R. Digumarthy, MD, Boston, MA (*Abstract Co-Author*) Speaker, Siemens AG; Research Grant, Lunit Inc; Researcher, Merck & Co, Inc; Researcher, Pfizer Inc; Researcher, Bristol-Myers Squibb Company; Researcher, Novartis AG; Researcher, F. Hoffmann-La Roche Ltd; Researcher, Polaris Pharmaceuticals, Inc; Researcher, Cascadia Healthcare, LLC; Researcher, AbbVie Inc; Researcher, Gradalis, Inc; Researcher, Clinical Bay; Researcher, Zai Lab
Mannudeep K. Kalra, MD, Lexington, MA (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, Riverain Technologies, LLC;

For information about this presentation, contact:

ruhanidoda@gmail.com

PURPOSE

We hypothesized that machine learning (ML)-based segmentation and radiomic features of liver from a single section of dual-energy CT can differentiate between normal, fatty and cirrhotic liver.

METHOD AND MATERIALS

Our IRB-approved study included 75 patients (mean age 54 ± 16 years; 44 females, 31 males) who underwent clinically-indicated, contrast-enhanced, portal venous phase, dual-energy abdomen-pelvis CT (SOMATOM Flash, Siemens). Low and high tube potential

(80 and 140 kV) image datasets were de-identified and exported to a DECT segmentation and radiomic features analyses prototype (Radiomics, Siemens). The prototype enabled automatic segmentation of liver on a single CT section at the level of the porta hepatis. DECT iodine quantification and radiomics features were derived for the segmented portion of the liver in XML file format. The XML files were imported into a separate ML-based statistical analysis prototype (Radiomics, Siemens) for univariate and multivariate logistic regression and random forest classification.

RESULTS

Both iodine quantification (best AUC 0.95) and radiomic features (best AUC 0.95) differ significantly between normal, fatty and cirrhotic livers ($p<0.0001$). Normalized iodine concentration was superior than the iodine concentration and mean iodine uptake ($p<0.0004$) for differentiating the normal from fatty and cirrhotic liver. Amongst the radiomic features, the first order statistics demonstrated the highest accuracy (AUC 0.90-0.95, $P< 0.0001$). Machine learning based random forest classification yielded an AUC of 0.91 for differentiating normal from cirrhotic liver, 0.95 (AUC) for differentiating fatty and normal liver and 0.93 (AUC) for differentiating fatty and cirrhotic liver.

CONCLUSION

Single-section, DECT iodine quantification and radiomics features enable near-perfect differentiation (AUC up to 0.954) of normal, fatty, and cirrhotic liver from single-section analyses. The most accurate features were iodine concentration and first order statistics from radiomic analyses.

CLINICAL RELEVANCE/APPLICATION

Machine learning-enabled radiomics from single-section DECT can enable automatic distinction of normal liver from fatty and cirrhotic liver.

SSG04-04 Assessment of Liver Fibrosis with Quantitative Analysis of Tc-99m Diethylenetriamine-pentaacetic Acid-galactosyl Human Serum Albumin (GSA) SPECT/CT: Comparison with Histopathological Fibrosis in Hepatectomy Specimen

Tuesday, Dec. 3 11:00AM - 11:10AM Room: E353A

Participants
Yasutaka Ichikawa, MD, Tsu, Japan (*Presenter*) Nothing to Disclose
Motonori Nagata, MD, PhD, Tsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroki Ikuma, MD, Tsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Masaki Ishida, MD, PhD, Tsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Hajime Sakuma, MD, Tsu, Japan (*Abstract Co-Author*) Research Grant, EIZAI; Research Grant, DAIICHI SANKYO Group; Research Grant, FUJIFILM Holdings Corporation; Research Grant, Guerbet SA; Research Grant, Nihon Medi-Physics Co, Ltd;

PURPOSE

Assessment of liver fibrosis severity is essential in optimizing treatment in patients with chronic liver disease. Tc-99m GSA scintigraphy has been shown to be useful in assessing regional liver functional reserve, because its liver uptake and blood clearance have strong association with several hepatic function tests such as ICG15. However, the relationship between liver fibrosis and quantitative indices by Tc-99m GSA imaging has not been fully elucidated. The purpose of this study was to evaluate the value of quantitative assessment of Tc-99m GSA SPECT/CT to estimate the extent of liver fibrosis determined by hepatectomy specimen.

METHOD AND MATERIALS

Fifty-five patients who underwent Tc-99m GSA imaging before hepatectomy were studied. Following bolus injection of 185MBq Tc-99m GSA, planar dynamic scintigraphy was performed for 20 minutes. Immediately after the planar acquisition, SPECT data was acquired for 8 minutes (60 steps of 6 s/step and 128x128 matrix). SPECT images were reconstructed with CT attenuation correction and scatter correction. Liver uptake ratio (LUR) defined as radioactivity in whole liver divided by injected radioactivity was calculated. LHL15, a conventional index used for Tc-99m GSA planar scintigram, was also measured. LUR and LHL15 measurements were compared with the histopathological grade of liver fibrosis (F0-F4: F0, absence of fibrosis; F4, severe fibrosis).

RESULTS

LUR measured by SPECT/CT had significant negative correlation with the liver fibrosis stage ($p<0.0001$, $r=-0.60$). LUR in patients with severe liver fibrosis (F4) (30.7±12.8%) were significantly lower than those with absence/mild liver fibrosis (F0-1) (49.8±6.6%, $p<0.0001$) and intermediate liver fibrosis (F2-3) (46.0±9.3%, $p=0.017$) (Figure 1A). The areas under ROC curve of LUR for the prediction of severe liver fibrosis (F4) was 0.90 (Figure 1B). With an optimal LUR threshold of 40.4%, the sensitivity and specificity of LUR in detecting severe liver fibrosis was 90.9%(10/11) and 90.9%(40/44). The sensitivity and specificity of LHL15 to diagnose severe liver fibrosis was 72.7%(8/11) and 81.8%(36/44), respectively.

CONCLUSION

Quantitative assessment of Tc-99m GSA SPECT permits accurate prediction of severe liver fibrosis with the sensitivity and specificity of > 90%.

CLINICAL RELEVANCE/APPLICATION

Liver uptake ratio quantified with Tc-99m GSA SPECT/CT is a promising biomarker to estimate the severity of liver fibrosis.

SSG04-06 Breath-Hold Look-Locker Inversion Recovery T1 Map on Gd-EOB-DTPA-Enhanced Liver MRI to Estimate Liver Function: Calibration, Reproducibility, and Diagnostic Value

Tuesday, Dec. 3 11:20AM - 11:30AM Room: E353A

Participants
Jimi Huh, MD, Suwon, Korea, Republic Of (*Presenter*) Nothing to Disclose
Tae Young Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Gyeong Min Park, MD, Ulsan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Soon Chan Park, BS, Ulsan , Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Munyoung Paek, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

Dominik Nickel, Erlangen, Germany (*Abstract Co-Author*) Employee, Siemens AG
Bohyun Kim, MD, Suwon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hye Jin Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jei Hee Lee, MD, Suwon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jai Keun Kim, MD, PhD, Suwon-si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Kyung Won Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jimihuh.rad@gmail.com

PURPOSE

To validate Look-Locker T1 map on EOB-MRI for the calibration performance, reproducibility, and diagnostic value to estimate liver function.

METHOD AND MATERIALS

Look-Locker T1 map was established to scan a slice in 13 seconds. For calibration, a quantitative T1-phantom was generated using Gd-EOB-DTPA solutions of various concentrations and was scanned to evaluate T1 linearity. In total 466 consecutive patients with chronic liver disease or liver cirrhosis, MRIs were scanned with a T1-phantom attached. In the liver, T1 values on precontrast and 20-min postcontrast T1 maps were measured and its difference (ΔT1 = T1post - T1pre) and relative change (%ΔT1 = ΔT1 / T1pre) were calculated. Relative liver enhancement at 20-min postcontrast T1-WI was calculated [%RLE = (SIpost - SIpre)/SIpre]. Correlation between MRI indices and Child-Pugh score was calculated. Accuracy of ΔT1, %ΔT1, and RLE to diagnose decompensated cirrhosis was evaluated by receiver-operating-characteristics (ROC) analysis. Reproducibility of T1 value of attached phantom across all patients (n=466) and test-retest repeatability of T1 map of the liver in the same patients (n=52) were evaluated using repeatability coefficient (RC).

RESULTS

Phantom study showed excellent T1 linearity (coefficient of determination R2, 0.9737). In patients, the correlation coefficients between MRI indices and Child-Pugh score was high in %ΔT1 (r=0.584), but low in ΔT1 (r=0.339) and %RLE (r=0.241). Accuracy to diagnose Child-Pugh class B and C differentiating from class A was high in both %ΔT1 and RLE (AUC 0.798 and 0.838, respectively), but low in ΔT1 (AUC 0.683). Accuracy to diagnose Child-Pugh class C differentiating from class A and B was excellent in both %ΔT1, RLE and ΔT1 (AUC 0.993, 0.976, and 0.976, respectively). Reproducibility across all patients (RC 68.16) and test-retest repeatability in the same patients (RCs, 74.7 in T1pre and 79.4 in T1post) were good.

CONCLUSION

T1 map using Look-Locker sequence on EOB-MRI showed promise for evaluating liver function in patients, especially diagnosing decompensated liver cirrhosis. Of MRI indices, %ΔT1 might be the best index for liver function assessment.

CLINICAL RELEVANCE/APPLICATION

Breath-hold Look-Locker T1 map on EOB-MRI can overcome the conventional T1 map's limitation, a long scan time, thus can be easily incorporated in the routine liver MRI for chronic liver disease.

SSG04-07 Diuretic Use Associated with Discordant Estimation of Liver Fibrosis between Magnetic Resonance Elastography (MRE) and Transient Elastography (TE)

Tuesday, Dec. 3 11:30AM - 11:40AM Room: E353A

Participants
Brian Horwich, MD,MS, Los Angeles, CA (*Presenter*) Nothing to Disclose
Shida Haghighat, MD,MPH, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Patrick Chang, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Suzanne L. Palmer, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Hyosun Han, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

bhorwich@usc.edu

PURPOSE

Magnetic resonance elastography (MRE) and transient elastography (TE) are preferred surveillance tools for low-risk individuals with liver disease. However, the estimated METAVIR fibrosis stage of these two studies are frequently discordant, obfuscating clinical decision-making. This study aims to identify factors that may contribute to this discordance.

METHOD AND MATERIALS

The radiology database was queried for patients with a TE within 18 months of MRE study from January 1, 2015 to September 30, 2018. Relevant clinical data were collected and analyzed from identified subjects.

RESULTS

The subjects (N=35) had a mean age of 57.6 years and 51.4% were obese (BMI >= 30 kg/m2). The most represented liver disease was nonalcoholic fatty liver disease (62.9%). The most represented comorbidities were hypertension (40.0%) and diabetes (34.3%). A Pearson's chi-square test identified factors associated with discordance in estimated METAVIR fibrosis stage, defined as difference in estimated stage (F0 to F4) greater than 1. Even with the small number of patients on diuretic therapy (n=14), there was a statistically significant discordance associated with diuretic use (p=0.02). There was no significant discordance in individuals with hypertension (p=0.62), or elevated serum creatinine (p=0.79).

CONCLUSION

This small, retrospective cohort study demonstrates a statistically significant discordance in estimated METAVIR fibrosis stage between TE and MRE in patients on diuretic therapy (p=0.02).

CLINICAL RELEVANCE/APPLICATION

Prior studies have demonstrated that venous congestion affects MRE and TE estimation of liver fibrosis. It has also been shown that hepatic venous congestion preferentially accumulates in peripheral liver tissue. As MRE evaluates a larger proportion of the patient's liver, prior research in heart failure patients suggest that MRE more completely characterizes the liver parenchyma. Because TE primary evaluates peripheral tissue, its estimation of liver fibrosis may be more sensitive to changes in volume status. Thus, our observed discordance between MRE and TE in patients on diuretics may be a result of the location of liver tissue assessed. This suggests that MRE may be the preferred initial study for patients on diuretics as its fibrosis estimation may be less affected by fluctuations in volume status. Further study on variability of estimated fibrosis by TE and MRE with concomittant diuretic use is warranted.

SSG04-08 Estimation of Minimal Liver Fibrosis Using Gadoxetic Acid-Enhanced Liver MRI and Machine Learning

Tuesday, Dec. 3 11:40AM - 11:50AM Room: E353A

Participants
Keigo Narita, Hiroshima, Japan (*Presenter*) Nothing to Disclose
Yuko Nakamura, MD, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Motonori Akagi, MD, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Toru Higaki, PhD, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Makoto Iida, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazuo Awai, MD, Hiroshima, Japan (*Abstract Co-Author*) Research Grant, Canon Medical Systems Corporation; Research Grant, Hitachi, Ltd; Research Grant, Fujitsu Limited; Research Grant, Bayer AG; Research Grant, DAIICHI SANKYO Group; Research Grant, Eisai Co, Ltd;

PURPOSE

The prognosis of patients with chronic hepatitis depends on fibrotic progression. As the transition from minimal to intermediate fibrosis is a major deleterious step, the accurate diagnosis of minimal fibrosis is of clinical importance. Liver biopsy, the reference standard for diagnosing and staging liver fibrosis, is invasive. As MR elastography, an imaging method for diagnosing liver fibrosis, may not be available in many hospitals, we developed a new method for its estimation on gadoxetic acid-enhanced liver MR images using support vector machines (SVM), a traditional application of machine learning. We assessed the diagnostic ability of our SVM analysis using parameters derived from gadoxetic acid-enhanced MR images for identifying minimal liver fibrosis.

METHOD AND MATERIALS

We included 182 patients with pathologically-diagnosed fibrosis stages. The parameters were based on texture analysis of hepatobiliary-phase images. To investigate the significant parameters for the staging of liver fibrosis we performed univariate logistic regression analysis. Parameters with statistical significance were subjected to analysis using multi-class SVMs, and their ability to identify minimal liver fibrosis (F-score >= 2) was determined. The FIB4 index which considers the patient age, the aspartate aminotransferase- and alanine aminotransferase level, and the platelet count was also calculated because it is correlated with the severity of liver fibrosis.

RESULTS

Univariate logistic regression analysis revealed that mean, standard deviation, skewness, kurtosis, the angular second moment, contrast, and entropy were important for the staging of liver fibrosis. The FIB4 index was also significant. The sensitivity, specificity, and accuracy for staging minimal liver fibrosis were 91.5, 55.8, and 81.3% for SVM analysis and 85.4, 60.4, and 78.7% for the FIB4 index based on an optimal cutoff value of 1.90.

CONCLUSION

SVM analysis using parameters derived from gadoxetic acid-enhanced MRI scans was more accurate than the FIB4 index for the staging of minimal liver fibrosis.

CLINICAL RELEVANCE/APPLICATION

SVM analysis using gadoxetic acid-enhanced MRI scans of the liver is a promising method for assessing minimal liver fibrosis.

SSG04-09 Evaluation of Liver Fibrosis by Assessing Hepatic Extracellular Volume Fraction Before and After Direct-Acting Antiviral Therapy in Patients with Chronic Hepatitis C Infection: Comparison with Serum Fibrosis-4 Index

Tuesday, Dec. 3 11:50AM - 12:00PM Room: E353A

Participants
Akihiko Kanki, MD, Kurasiki, Japan (*Presenter*) Nothing to Disclose
Atsushi Higaki, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Hidemitsu Sotozono, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Kiyoka Maeba, MD, Kurashiki-City, Japan (*Abstract Co-Author*) Nothing to Disclose
Akira Yamamoto, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Tsutomu Tamada, MD,PhD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The utility of direct-acting antiviral therapy (DAA) in improving liver fibrosis in patients with chronic hepatitis C virus infection remains unclear. Recent studies demonstrated a strong correlation between hepatic extracellular volume fraction (ECV), assessed using contrast-enhanced CT (CE-CT), and histologic liver fibrosis. Additionally, the fibrosis-4 index (FIB-4) has been proposed as a surrogate marker for hepatic fibrosis in patients with chronic liver disease. This study aimed to evaluate time-dependent changes in ECV using multiphasic contrast-enhanced CT and FIB-4 before and after DAA, and to clarify the difference between both indices.

METHOD AND MATERIALS

Study participants included 41 patients with hepatitis C virus infection who achieved sustained virological response after DAA. All patients underwent multiphasic CE-CT and biochemical examination of blood before and after DAA (pre-treatment, time point 1 (T1); less than 6 months after DAA, T2; 6 to 12 months, T3; 12 to 24 months, T4; greater than 24 months, T5). Absolute

enhancements (in Hounsfield units) of the liver parenchyma (Eliver) and aorta (Eaorta) were measured on precontrast and equilibrium phase scans. ECV was calculated using the following equation: ECV (%) = ΔHUliver/ΔHUaorta × (100 - Hematocrit [%]). FIB-4 was simultaneously calculated using age, AST, ALT and platelet count.

RESULTS

ECV and FIB-4 after DAA showed a significant decrease at the end of the study period as compared to their values at T1 (ECV: 27.49 ± 3.72 and 29.45 ± 4.83, p=0.022; and FIB-4: 3.07 ± 1.88 and 4.40 ± 3.47, p=0.001, respectively). ECV showed a significant positive correlation with FIB-4 (r=0.458, p=0.003) at T1, although there was no correlation at the end of the study period (r=0.170, p=0.289). In ECV comparisons between the different time points, a significant difference was seen between T1 and T4, and T1 and T5 (p=0.046 and 0.022, respectively). In FIB-4 comparisons, significant differences were seen between T1 and all other time points (p=0.003 to p<0.001), although no differences in FIB-4 were seen in all comparisons between T2 to T5 (p>0.05).

CONCLUSION

ECV decreased slowly after DAA, suggesting an improvement in hepatic fibrosis. On the other hand, FIB-4 decreased immediately, probably due to an improvement in hepatic inflammation.

CLINICAL RELEVANCE/APPLICATION

ECV has the potential to be a non-invasive biomarker for the assessment of liver fibrosis after DAA.

Printed on: 10/29/20

SSG05

Gastrointestinal (MR Diagnosis)

Tuesday, Dec. 3 10:30AM - 12:00PM Room: E351

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Janio Szklaruk, MD, PhD, Houston, TX (*Moderator*) Nothing to Disclose
Cynthia S. Santillan, MD, San Diego, CA (*Moderator*) Consultant, Robarts Clinical Trials, Inc
Alessandro Furlan, MD, Pittsburgh, PA (*Moderator*) Book contract, Reed Elsevier; Royalties, Reed Elsevier

Sub-Events

SSG05-01 Recurrence of HBV-Related Hepatocellular Carcinoma: Diagnostic Algorithms on Gadoxetic Acid-Enhanced MRI

Tuesday, Dec. 3 10:30AM - 10:40AM Room: E351

Participants
Wentao Wang, MD,MD, Shanghai, China (*Presenter*) Nothing to Disclose
Li Yang, MD, PhD, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Mengsu Zeng, MD, PhD, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Shengxiang Rao, MD, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

787356268@qq.com

PURPOSE

to better characterize intrahepatic recurrence <20mm after resection of HCC using gadoxetic acid-enhanced MR imaging

METHOD AND MATERIALS

Between March 2012 and January 2017, a total of 373 nodules (median size, 1.4 cm; range, 5.5-19 mm) in 204 HCC patients (median age, 55 years; range, 27-79 years) with chronic hepatitis B virus (HBV) infection after hepatectomy underwent gadoxetic acid-enhanced MR imaging and were included in the retrospective study. Diagnostic performance of the LI-RADS systems were calculated for characterizing recurrence. The modified diagnostic algorithms were proposed by combining significant imaging biomarkers respectively related to subcentimeter and 10-20mm recurrences in multivariate analyses and were compared with the LI-RADS imaging criteria by using McNemar test.

RESULTS

The multivariate analyses showed that nonrim arterial phase hyperenhancement and the three LI-RADS ancillary features (hepatobiliary phase hypointensity, mild-moderate T2 hyperintensity and restricted diffusion) were significantly related with recurrence <20mm. For subcentimeter recurrence, the modified diagnostic algorithm of combining at least two of the three ancillary features achieved better diagnostic performance (sensitivity: 83.3%; specificity: 87.7%) than the LI-RADS 4 criteria (sensitivity: 88.9%, P=0.211; specificity: 70.8%, P=0.006). For 10-19 mm recurrence, combining nonrim arterial phase hyperenhancement and at least one of the three ancillary features achieved significantly enhanced sensitivity of 85.1% and relative high specificity of 86.5% than the LI-RADS 5 criteria (sensitivity: 63.5%, P<0.001; specificity: 94.2%, P=0.134).

CONCLUSION

The diagnostic algorithms for subcentimeter and 10-19mm recurrent HCC should be stratified. For subcentimeter recurrences, the modified diagnostic algorithm on gadoxetic acid-enhanced MRI demonstrated preserved high sensitivity with significantly enhanced specificity than LI-RADS 4 criteria.

CLINICAL RELEVANCE/APPLICATION

The multivariate analyses showed that arterial phase hyperenhancement was the most reliable major feature for characterizing 10-20 mm recurrence while the ancillary features were more valuable for characterizing <10mm recurrence. 3. Our modified diagnostic algorithms demonstrated significantly enhanced sensitivity with preserved high specificity for characterizing recurrent HCC <20mm.

SSG05-02 Exploring Prognostic Risk Factors and Survival Models for T3 Locally Advanced Rectal Cancer: What Can We Learn From the Baseline MRI?

Tuesday, Dec. 3 10:40AM - 10:50AM Room: E351

Participants
Qing Zhao, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Hongmei Zhang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Xinming Zhao, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

Lijuan Wan, Beijing, China (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

zq_pumc@163.com

PURPOSE

To evaluate the baseline MRI characteristics in predicting disease-free survival (DFS) and cancer-specific survival (CSS) in patients with T3 LARC and to explore individualized prognostic risk-stratification models.

METHOD AND MATERIALS

This study retrospectively reviewed 256 T3 LARC patients evaluated from January 2008 to December 2012 in our institution with an average follow-up period of 6.1 years. Two trained radiologists independently evaluated baseline MRI characteristics and reached consensus. Kaplan-Meier survival curves and Cox regression analysis were used to determine the relationship of MRI parameters and other clinicopathological factors to DFS and CSS using SPSS. R software was used to develop individualized risk-stratification nomograms for 3-year and 5-year DFS and CSS. Independent validation was assessed by Harrell concordance (C)-index.

RESULTS

Independent predictors of DFS were found to include baseline MRI-defined T3 substaging (hazard ratio, HR = 3.09, $P < 0.001$), extramural venous invasion (EMVI) grading (HR = 3.08, $P < 0.001$), rectal mucinous adenocarcinoma (RMAC) (HR = 2.44, $P < 0.001$), threatened mesorectal fascia (MRF) (HR = 1.73, $P = 0.038$), neoadjuvant chemoradiotherapy (NCRT) (HR = 0.44, $P < 0.001$) and an elevated pretreatment carcinoembryonic antigen (CEA) level (HR = 1.93, $P < 0.001$). In addition, T3 substaging (HR = 4.09, $P < 0.001$), EMVI grading (HR = 2.19, $P < 0.001$) and NCRT (HR = 0.58, $P = 0.006$) independently affected CSS. The nomograms permitted individualized prediction of 3-year and 5-year DFS and CSS probability with high performance (C-index range, 0.848-0.883).

CONCLUSION

Baseline MRI-defined T3 substaging, EMVI grading, threatened MRF, RMAC, and elevated pretreatment CEA were adverse prognosticators, whereas NCRT promoted positive outcome, in patients with T3 LARC. The models can facilitate individualized pretreatment survival risk-stratification.

CLINICAL RELEVANCE/APPLICATION

This study identified independent prognostic factors and developed nomogram models with high performance for individualized pretreatment prediction of 3-year and 5-year disease-free survival and cancer-specific survival in patients with T3 locally advanced rectal cancer. The models can facilitate individualized pretreatment survival risk-stratification and aid in clinical decision-making.

SSG05-03 Interobserver Variation in the Interpretation of MR Enterography for Crohn's Disease

Tuesday, Dec. 3 10:50AM - 11:00AM Room: E351

Participants
Gauraang Bhatnagar, FRCR,MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose
Laura Quinn, Birmingham, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Richard A. Beable, MBChB, Portsmouth, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Helen Bungay, MBBCh, Oxford, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Gillian Duncan, Dundee, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Anthony Higginson, Portsmouth, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Rachel Hyland, MBChB, FRCR, Leeds, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Rajapandian Ilangovan, MD, FRCR, Northwood, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Hannah Lambie, Bradford, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Evgenia Mainta, MD, MMedSc, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Uday B. Patel, MBBS, BSc, Sutton, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Francois Porte, MBBS, BSc, Tunbridge Wells, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Andrew Plumb, MBBCh, MRCP, Stockport, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Andrew Slater, MBBCh, Oxford, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Mariead Tennent, Dundee, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Damian J. Tolan, MBBCh, FRCR, Leeds, United Kingdom (*Abstract Co-Author*) Speaker, Bracco Group Speaker, Merck & Co, Inc
Ian A. Zealley, MBChB, Perth, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Steve Halligan, MD, Herts, United Kingdom (*Abstract Co-Author*) Research Consultant, iCad, Inc
Sue Mallett, DIPLPHYS,MS, Birmingham, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Stuart A. Taylor, MBBS, Great Missenden, United Kingdom (*Abstract Co-Author*) Research Consultant, Robarts Clinical Trials, Inc; Shareholder, Motilent

For information about this presentation, contact:

g.bhatnagar@nhs.net

PURPOSE

Quantifying interobserver variability is an important part in evaluating medical imaging. Interpretation of MR enterography (MRE) is complex, and to date there has been little research into interobserver variability across multiple observers.

METHOD AND MATERIALS

The study utilised datasets from a prospective trial comparing the diagnostic accuracy of MRE and US for CD (either newly diagnosed or relapsing disease) recruited from 8 centres. A construct reference standard (multidisciplinary panel diagnosis) was used, incorporating 6 months follow up. 73 (28 new diagnosis, 45 suspected relapse) trial MREs were interpreted 3 times by one of 27 radiologists via an online platform (Biotronics 3Dnet). Radiologists were randomly allocated datasets, blinded to each other's interpretation, patient's symptoms and history, and documented the presence/location of small bowel and colonic disease. Data was analysed separately for new diagnosis and relapse cohorts. Interobserver variability was measured by averaging percentage agreement with the consensus reference standard across the 3 reads, grouped as disease positive or negative. Prevalence

adjusted bias adjusted kappa (PABAK) was reported. Agreement between the radiologists irrespective of agreement with the reference standard was also reported.

RESULTS

For newly diagnosed patients, overall percentage agreement for small bowel disease presence against the consensus reference was 68%, with kappa coefficient(κ) 0.36 (fair agreement). Agreement for colonic disease presence was 61%, κ 0.21(fair agreement). For relapsing cohort, overall percentage agreement for small bowel disease presence against the consensus reference was 76%, κ 0.51(moderate agreement). Agreement for colonic disease presence was 61%, κ 0.21(slight agreement). Agreement was similar when reads were considered without reference to the consensus reference (72% and 60% for small bowel and colonic disease presence respectively).

CONCLUSION

Based on data from a multi-reader, multicenter prospective trial, there is fair to moderate agreement between radiologists for the presence of small bowel and colonic disease against an independent standard of reference

CLINICAL RELEVANCE/APPLICATION

Compared to an independent standard of reference there is fair to moderate agreement between radiologists for the presence of enteric disease on MRE. This indicates the need for standardised training.

SSG05-04 MRI Evaluation of Lateral Pelvic Lymph Node in Locally Advanced Rectal Cancer: Optimized Cutoff Value Chosen and the Relationship to Overall Survival

Tuesday, Dec. 3 11:00AM - 11:10AM Room: E351

Participants
Rui-Jia Sun, Beijing, China (*Presenter*) Nothing to Disclose
Qiao-Yuan Lu, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Xiao-Ting Li, Peking City, China (*Abstract Co-Author*) Nothing to Disclose
Hui Ci Zhu, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Ying-shi Sun, MD,PhD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

srj777@163.com

PURPOSE

To study the relationship between MRI-detected pretreatment lateral pelvic lymph node (LPLN) metastasis and prognosis in patients with locally advanced rectal cancer treated with neoadjuvant chemotherapy-radiation therapy (CRT).

METHOD AND MATERIALS

This retrospective study included 517 patients with locally advanced rectal cancer evaluated from August 2008 to December 2014. Baseline and post-CRT MRI and follow-up data were retrieved for all patients. MRI findings of LPLN metastasis were evaluated. Kaplan-Meier curves and ROC analysis were used to determine the relationship of baseline MRI findings to overall survival.

RESULTS

227 patients (43.9%) had visible LPLNs with short axis of at least 5mm on pretreatment MRI. Univariate cox analysis indicated that the short axis (HR=1.12, 95%CI: 1.04-1.21, p<0.01) as well as the long axis of the largest LPLN (HR=1.07, 95%CI:1.02-1.13, P=0.01) were associated with the overall survival (OS). However, there was no significant relation to the metastasis free survival or the local recurrence free survival. A cut-off of 8mm and 12mm were selected for short and long axis respectively by using survival ROC analysis. Kaplan-Meier method showed LPLNs with a short axis greater than 8 mm resulted in a significantly poor OS (3-year OS 92.5% vs 79.7% for less than 8mm vs equal to or greater than 8mm, P<0.01). LPLNs with a long axis greater than 12 mm resulted in a significantly poor OS (3-year OS 92.3% vs 77.3% for less than 12mm vs equal to or greater than 12mm, P<0.01).

CONCLUSION

The presence of lateral pelvic lymph node (LPLN) was associated with overall death in patients with locally advanced rectal cancer. Further research is needed about which pretreatment features of the LPLN predict prognosis and what is needed to prevent these from developing.

CLINICAL RELEVANCE/APPLICATION

The presence of lateral pelvic lymph node at baseline MRI in local advanced rectal cancer is associated with overall survival in patients with locally advanced rectal cancer.

SSG05-05 Visual Grading of Hepatic Steatosis on In and Opposed Phase Imaging: Validation by Reference to Proton Density Fat Fraction

Tuesday, Dec. 3 11:10AM - 11:20AM Room: E351

Participants
Ali B. Syed, MD, Philadelphia, PA (*Presenter*) Research Consultant, IBM Corporation
Badar Bin Bilal Shafi, MBBS, MRCP, Liverpool, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Flavius F. Guglielmo, MD, Moorestown, NJ (*Abstract Co-Author*) Nothing to Disclose
Jaydev K. Dave, PHD, Philadelphia, PA (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV Equipment support, Lantheus Medical Imaging, Inc Equipment support, General Electric Company
Donald G. Mitchell, MD, Philadelphia, PA (*Abstract Co-Author*) Consultant, CMC Contrast AB

For information about this presentation, contact:

Ali.b.syed@jefferson.edu

PURPOSE

To develop and validate a qualitative, visual scale that can be used to grade severity of hepatic steatosis on in and opposed phase imaging.

METHOD AND MATERIALS

An IRB approved retrospective study was performed. From our institutional PACS, 429 MRI exams were identified that included both quantitative evaluation of proton density fat fraction (PDFF), and dual gradient echo in and opposed phase imaging. PDFF was calculated using the IDEAL-IQ technique (GE Healthcare, Milwaukee, WI). A subset of 113 patients was selected, (44 men and 66 women, ranging from 24-77 years of age), with PDFF ranging from 2% to 43%. Cases with abnormal hepatic iron concentrations (n=4) were excluded. Two readers independently provided visual steatosis score (VSS) according to our proposed 7-point scale based on visual cues, using in and opposed phase imaging only, without reference to clinical history, PDFF or other images. The VSS and PDFF were then compared for each study. ANOVA was performed to identify differences in PDFF as a function of VSS. 95% confidence intervals (CI) were constructed to determine the PDFF values that correlated with each VSS. Interclass correlation coefficient (ICC) was calculated to assess reliability (agreement and correlation).

RESULTS

ANOVA showed a statistically significant difference in PDFF for each VSS ($p < 0.05$). 95% CI of PDFF for each VSS were as follows. VSS-0: PDFF 4 to 6%; VSS-1: PDFF 7 to 12%; VSS-2: PDFF 15 to 18%; VSS-3: PDFF 26 to 29%; VSS-4: PDFF 31 to 40%; VSS-5: No exams scored; VSS-6: PDFF 35 to 45%. ICC was 0.92, indicating excellent reliability.

CONCLUSION

Specialized sequences for quantitative evaluation of hepatic steatosis are not always included in routine MR abdomen examination. Simple dual-echo technique (matched in and opposed phase) is routinely used as a component of abdominal MRI, including for detecting hepatic steatosis, but severity of steatosis on these sequences is subjective and not standardized. We propose a visual scale that can easily be employed during interpretation which can reliably differentiate various degrees of steatosis in the range commonly seen clinically (0 to 40%).

CLINICAL RELEVANCE/APPLICATION

Simple visual cues can be used to qualitatively grade hepatic steatosis on in and opposed phase imaging, providing greater standardization than currently utilized; these grades are reproducible between readers and demonstrate distinct degrees of steatosis as validated by PDFF.

SSG05-06 The Utility of MR Elastography for Differentiating Non-Cirrhotic Portal Hypertension from Cirrhotic Portal Hypertension

Tuesday, Dec. 3 11:20AM - 11:30AM Room: E351

Participants
Tolga Gidener, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Patrick Navin, MBBCh,MRCPI, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Alina Allen, Rochester, MN (*Abstract Co-Author*) Research support, Gilead Sciences, Inc
Meng Yin, PhD, Rochester, MN (*Abstract Co-Author*) Intellectual property, Magnetic Resonance Innovations, Inc; Stockholder, Resoundant, Inc
Michael Torbenson, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Patrick S. Kamath, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Richard L. Ehman, MD, Rochester, MN (*Abstract Co-Author*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc;
Sudhakar K. Venkatesh, MD, FRCR, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

venkatesh.sudhakar@mayo.edu

PURPOSE

In clinical practice, it is difficult to differentiate non cirrhotic portal hypertension (NCPH) from cirrhotic portal hypertension (CPH), based only on clinical and non-invasive objective methods. In this study we evaluated the utility of MR Elastography (MRE) for differentiating NCPH from CPH

METHOD AND MATERIALS

From our database we retrospectively identified 60 patients with NCPH and had MRE. Forty age and sex-matched patients with CPH who had MRE formed the control group. Liver morphologic features, signs of portal hypertension, and overall impression of cirrhosis and PH on MRI images were evaluated. MRE was performed with standard clinical 2D-GRE-MRE sequence. Regions of interest (ROI) were drawn on both liver and spleen on the stiffness map and mean stiffness measurements (kilopascals, kPa) were generated for liver stiffness (LSM) and spleen stiffness (SSM) for each subject. Chi-square analysis for morphologic features and non-parametric analysis for mean LSM, mean SSM, and mean SSM/mean LSM ratio (SSM/LSM) were performed for significant differences. Receiver operating curve (ROC) analysis was also performed when differences were significant.

RESULTS

Mean LSM was significantly higher in CPH group than NCPH [9.7 kPa (95% CI 6.3-13.1) vs. 3.4 kPa (95%CI, 2.0-4.8), $p<0.001$]. Meanwhile mean SSM was not significantly different between CPH and NCPH [7.8 kPa (95%CI, 6.1-9.5) vs. 8.0 kPa (95%CI, 3.7-12.3), $p=0.21$]. SSM/LSM ratio was significantly higher in NCPH than CPH [2.6 kPa (95%CI, 1.0-4.2), vs. 0.9 kPa (95%CI, 0.6-1.2), $p<0.001$]. ROC analysis showed that a mean LSM >5.3 kPa had 100% sensitivity, 99% specificity and 98% accuracy to differentiate NCPH from CPH. SSM/LSM ratio of <1.3 had 88% sensitivity, 84% specificity and 92% accuracy to differentiate NCPH from CPH. Among the MRI morphological features, only the presence of esophageal varices (CPH > NCPH, $p<0.018$), the presence of perisplenic collaterals (NCPH>CPH, $p<0.04$) and the overall impression of cirrhosis (CPH> NCPH, $p<0.01$) were significantly different.

CONCLUSION

MR Elastography is a useful, non-invasive tool that can help differentiate NCPH from CPH.

CLINICAL RELEVANCE/APPLICATION

Non cirrhotic portal hypertension (NCPH) is difficult to differentiate from cirrhotic portal hypertension (CPH). MRE is an accurate non-invasive technique that can help differentiate NCPH from CPH.

SSG05-07 Role of Volumetric Functional MRI in Predicting Histopathologic Grade of Untreated Hepatocellular Carcinoma and Patient Survival

Tuesday, Dec. 3 11:30AM - 11:40AM Room: E351

Participants
Sanaz Ameli, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Roya Rezvani Habibabadi, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Robert Grimm, Erlangen, Germany (*Abstract Co-Author*) Employee, Siemens AG Stockholder, Siemens AG Patent holder, Siemens AG
Li Pan, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Robert Anders, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

sameli1@jhmi.edu

PURPOSE

To evaluate the role of volumetric ADC (vADC) and volumetric venous enhancement (vVE) in predicting the grade of tumor differentiation in hepatocellular carcinoma (HCC).

METHOD AND MATERIALS

This HIPPA compliant retrospective study was approved by our institutional review board. The study population included 136 HCC patients (188 lesions) who had baseline MR imaging and pathologic report of the HCC either by biopsy or liver transplantation between January 2001 and June 2017. Volumetric measurements of venous enhancement (VE) and apparent diffusion coefficient (ADC) were performed on baseline MRI. The tumors were histologically classified into two groups (low-grade and high-grade). The parameters between the two groups were compared using bivariate and multivariable analysis.

RESULTS

A total of 136 patients, with a median age of 61(56-67) were evaluated. 111 were male and 25 were female. Lesions with higher vADC values and higher absolute vADC-skewness were more likely to be high-grade on histopathology assessment ($p=0.001$ and $p=0.0291$, respectively). Also, venous enhancement showed a trend to be lower in high-grade lesions ($p=0.079$). vADC value of 1218.19 (x10-6 mm2/s) resulted in the highest sensitivity and specificity (77% and 74%, respectively) in distinguishing between the 2 groups. Additionally, vADC-skewness showed association with patient survival (HR=1.64, $p=0.035$; per increments in skewness).

CONCLUSION

vADC shows the highest accuracy in predicting HCC differentiation. Novel imaging biomarkers depicting tumor heterogeneity (e.g. skewness/kurtosis) could also be used to predict tumor features and patient's survival.

CLINICAL RELEVANCE/APPLICATION

Volumetric functional MRI metrics can be considered as non-invasive measures for determining tumor histopathology in HCC. These metrics can be used for modifying the management approach and reduce the need for tumor biopsy.

SSG05-08 Clinical Validation of Synthetic MRI in Assessing Rectal Cancer and Extramural Fat Invasion: Initial Experience

Tuesday, Dec. 3 11:40AM - 11:50AM Room: E351

Participants
Kexin Zhu, Shenyang , China (*Abstract Co-Author*) Nothing to Disclose
Jinli Zhao, Shenyang , China (*Abstract Co-Author*) Nothing to Disclose
Fei Bie, Shenyang , China (*Abstract Co-Author*) Nothing to Disclose
Yi Liu, MD, PhD, Shenyang, China (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

liuyicmu@sina.cn

PURPOSE

To evaluate the Clinical validation of Synthetic MRI in rectal cancer and extramural fat invasion.

METHOD AND MATERIALS

38 patients pathologically proven rectal cancer were included in the retrospective study, ethical approval and consent forms were obtained. All the patients underwent MR scans with both conventional MR and synthetic MR. Two experienced radiologists independently reviewed the images and identified the regions of normal rectal wall, tumor and extramural fat. The T1/T2/PD values of these different regions were obtained using synthetic MR. T test, Wilcoxon signed-rank test, and Mann-Whitney U test were used to contrast T1/T2/PD values between normal rectal wall and tumor, and that of extramural fat in rectal cancer between T1/2 stage cases and T3/4 stage cases. The diagnostic efficacy was evaluated using the ROC curve. The $P<0.05$ was used to indicate

statistical significance

RESULTS

Compared with normal rectal wall, the rectal cancer had higher T2 value (P=0.00), however, T1 and PD values had no statistical difference. ROC curve analysis: T2 value (AUC=0.706; 95%CI=0.591-0.822). All of the PD, T1 and T2 values of the extramural fat of T3/4 stage rectal cancer higher than that of T1/2 stage rectal cancer (P=0.00). ROC curve analysis: PD value (AUC=0.808, 95%CI=0.685~0.930), T1 value (AUC=0.997, 95%CI=0.998~1.000), T2 value (AUC= 0.850, 95% CI = 0.699~1.000).

CONCLUSION

Synthetic MRI was useful in accessing rectal cancer and extramural fat invasion. Compare with the normal rectal wall, T2 value of rectal cancer has significantly diagnostic efficiency. T1 value of extramural fat has the highest diagnostic efficiency for invasion of rectal cancer.

CLINICAL RELEVANCE/APPLICATION

The results of this study indicated that Synthetic MRI was useful in evaluating rectal cancer and extramural fat invasion, especially in the diagnosis of extramural fat invasion.

SSG05-09 Comparison of Pre-Operative and Post-Operative MRI after Complex Fistula-In-Ano Surgery - Lessons Learnt in Interpreting Postoperative MRI Scans in an Audit of 1323 MRI

Tuesday, Dec. 3 11:50AM - 12:00PM Room: E351

Participants
Pankaj Garg, MBBS,MS, Mohali, India (*Presenter*) Nothing to Disclose
Sundeep Malla, MD, Delhi, India (*Abstract Co-Author*) Nothing to Disclose
Anjli Kinariwalla, Mumbai , India (*Abstract Co-Author*) Nothing to Disclose
Akhil Monga, MD,MBBS, New Delhi, India (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

drgargpankaj@yahoo.com

PURPOSE

The evaluation of MRI after fistula-in-ano surgery has never been done. The aim was to evaluate the utility of MRI in postoperative period after fistula-in-ano surgery.

METHOD AND MATERIALS

Preoperative MRI was done in all the patients and post-operative MRI was done to check radiological healing in clinically healed fistulas or when postoperative complication/ healing problem was seen

RESULTS

1323 MRI were done in 1003 fistula-in-ano patients, out of which, 702 patients underwent surgery. In 702 patients, there were 361-recurrent fistulas,153-associated abscess, 388-multiple tracts, 146-horseshoe and 76-supralevator fistula. 320 postoperative MRI were done in 180/702 patients.There were 189 grade I, 200 grade II, 52 grade III, 205 grade IV and 56 grade V fistula(St James classification). The requirement of postoperative MRI was significantly higher in complex (grade III-V) than simple fistulas (grade I-II) [43.5%(136/313) vs 11.3%(44/389) respectively, p<0.0001]. Lessons learnt in interpreting postoperative MRI scans -- MRI was quite accurate to assess healing as well as complications after fistula surgery. --Granulation tissue (healing tissue) and inflammation in tissues (post surgery) looked hyperintense on T2 and STIR and was difficult to differentiate from active fistula tract/ pus. Therefore MRI done in immediate postoperative period (upto 8 weeks post surgery) required care. --After complete healing, the complete tract and internal opening becomes hypointense on T2 and STIR --The complete radiological healing takes at least 10-12 weeks. So getting MRI scan for assessment of healing should be done after 12 weeks. --MRI is very accurate to identify and diagnose postoperative complications like abscess formation, missed tract during surgery or non-healing of a tract. MRI detects such complications even in clinically healed tracts. By early intervention, it helps to prevent delayed recurrence, abscess formation and further spread of tracts. --Closure/healing of internal opening and intersphincteric tract are assessed quite accurately by MRI and they correlate well with the fistula healing.

CONCLUSION

MRI is highly useful to assess healing and detect complications after fistula surgery espesially in higher grades.

CLINICAL RELEVANCE/APPLICATION

MRI is highly useful to assess healing and detect complications after anal fistula surgery. MRI scan for assessment of healing should be done at least after 12 weeks of surgery.

SSG16

Vascular/Interventional (Liver Cancer)

Tuesday, Dec. 3 10:30AM - 12:00PM Room: E260

GI IR VA

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Ronald S. Arellano, MD, Boston, MA (*Moderator*) Nothing to Disclose
Juan C. Camacho, MD, Charleston, SC (*Moderator*) Research Grant, El.en.
Paula Novelli, MD, Pittsburgh, PA (*Moderator*) Nothing to Disclose

Sub-Events

SSG16-01 Ultrasound-Guided Percutaneous Brachytherapy for the Treatment of Hepatocellular Carcinoma with Portal Vein Branch Tumor Thrombus

Tuesday, Dec. 3 10:30AM - 10:40AM Room: E260

Participants
Hong Duo, Shenyang, China (*Presenter*) Nothing to Disclose
Haibo Shao, MD, Shenyang, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

superchief2@126.com

PURPOSE

To evaluate the safety and efficacy of ultrasound guided iodine-125 implantation for the treatment of hepatocellular carcinoma with portal vein branch tumor thrombus (PVBTT).

METHOD AND MATERIALS

From June 2013 to August 2018, a total of 69 HCC patients complicated with PVBTT were included in this single-center retrospective study. 34 patients underwent iodine-125 seeds implantation combined with transarterial chemoembolization (TACE), while 35 patients underwent TACE alone. Outcomes were measured in terms of tumor response, overall survival (OS), progress free survival (PFS) and adverse events.

RESULTS

The technique was successfully performed in all patients. No complications grade 3 or higher according to Common Terminology Criteria for Adverse Events (CTCAE) version 3.0 occurred. In the analysis for PVTT response 1 month after treatment, TACE-Iodine125 group, 5 patients (14.7%) achieved CR, 15 patients (44.1%) achieved PR. Whereas in the TACE group, no patient achieved CR, 2 patients (5.7%) achieved PR. Patients receiving TACE-Iodine125 had a median OS and PFS of 11 months (95% CI: 8.5, 13.5) and 9 (95% CI: 6.0, 12.0), compared with 7 months (95% CI: 5.9, 8.1) and 3 months (95% CI: 1.7, 4.3) for those who receiving TACE only. Treatment strategy, type of PVTT were significant predictors of OS.

CONCLUSION

Ultrasound guided iodine-125 seed implantation is a safe and effective treatment for HCC patients with PVBTT.

CLINICAL RELEVANCE/APPLICATION

This study provide a convenient and efficient method in addition to Sorafenib and radiotherapy for unresectable HCC with PVBTT.

SSG16-03 Predictors of Successful Bridging to Liver Transplantation in Patients with Hepatocellular Carcinoma Undergoing Yttrium-90 Radioembolization Therapy

Tuesday, Dec. 3 10:50AM - 11:00AM Room: E260

Participants
Alexander Villalobos, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
William V. Wagstaff, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
James Zhang, BS,PhD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Mohammad Elsayed, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Zachary Bercu, MD, Decatur, GA (*Abstract Co-Author*) Nothing to Disclose
Robert M. Ermentrout, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Nima Kokabi, MD, Atlanta, GA (*Abstract Co-Author*) Research support, Sirtex Medical Ltd

PURPOSE

To identify key clinical and imaging predictors of successful bridging to liver transplantation (LT) in patients undergoing Yttrium-90

radioembolization (Y90 RE) therapy for hepatocellular carcinoma (HCC).

METHOD AND MATERIALS

A retrospective analysis was conducted in patients with HCC who were deemed by a multidisciplinary tumor board as candidates or potential candidates for LT by Milan Criteria (MC) and underwent Y90 RE as bridging therapy. Patients were divided into favorable and unfavorable Y90 RE response groups based on changes to their MC eligibility, with maintained or achieved eligibility defined as favorable, and unchanged or lost eligibility defined as unfavorable. Pre Y90 baseline prognostic factors were compared between favorable and unfavorable responders using chi-square, Fisher's exact test, and student's t-test analysis.

RESULTS

Between 2014 and 2018, 144 patients were deemed candidates or potential candidates for LT by MC and underwent Y90 RE bridging. Out of the 56 (39%) patients within MC, eligibility was maintained in 45 (80%) and lost in 6 (11%) patients. Out of the 88 (61%) patients outside MC, eligibility was achieved in 40 (45%) patients and remained unchanged in 45 (51%) patients. Among the 85 (59%) patients who experienced a favorable therapy response, 22 (26%) patients went on to receive LT. Comparison analysis between the favorable and unfavorable response groups suggested that younger age (p=0.0461), female gender (p=0.0095), unilobar distribution (p=0.0238), <=4 viable tumors (p=0.0058), smaller dominant lesion diameter (p=0.0058), lower tumor burden (p=<0.0001), lower Barcelona Clinic Liver Criteria (BCLC) stage (p=<0.0001), lower alkaline phosphatase (p=0.0456) and higher sodium blood levels (p=0.0084) were all associated with successful bridging to liver transplantation.

CONCLUSION

Certain favorable clinical and imaging characteristics in patients with HCC appear to be positive prognostic factors for the successful bridging to liver transplantation using Y-90 Radioembolization.

CLINICAL RELEVANCE/APPLICATION

Positive prognostic factors in patients with HCC can provide clinicians with opportunities to personalize Y-90 radioembolization treatments for potential liver transplant patients in need of maintaining or achieving transplantability status.

SSG16-04 Long-Term Outcomes of Combined Radiofrequency Ablation and Multipronged Ethanol Ablation for the Treatment of Unfavorable Hepatocellular Carcinoma

Tuesday, Dec. 3 11:00AM - 11:10AM Room: E260

Participants
Ming Liu, Guangzhou, China (*Presenter*) Nothing to Disclose
Guangliang Huang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Xiaoyan Xie, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

lium56@mail.sysu.edu.cn

PURPOSE

To evaluate the local efficacy, safety and long-term outcomes of combining radiofrequency ablation (RFA) and multipronged ethanol ablation (EA) in the treatment of unfavourable hepatocellular carcinoma (HCC) and determine the prognostic factors for survival.

METHOD AND MATERIALS

Between August 2009 and December 2017, 98 patients with 110 unfavourable HCC nodules who underwent combining RFA and multipronged EA were enrolled retrospectively in this study. Unfavourable HCC is defined as medium (3.1-5.0 cm) or large (5.1-7.0 cm) HCC, tumour located at a high-risk site or perivascular tumour. Treatment response, overall survival (OS) and recurrence-free survival (RFS) were analysed. The Kaplan-Meier method and Cox proportional hazards regression model were used to evaluate the prognostic factors.

RESULTS

Complete ablation (CA) was obtained in 80.9% (89/110) of the tumours after initial treatment. Major complications were observed in 3 (3.1%) patients. The cumulative incidence of local tumour progression (LTP) was 23.5% at 5 years, and no variable was found to be an independent predict factor for LTP. The five-year OS and RFS rates were 41.9% and 18.6%, respectively. Multivariate analysis showed that the serum alpha-fetoprotein (AFP) level and number of tumours were significant prognostic factors for OS (P= 0.017 and P< 0.001, respectively) and RFS (P= 0.014 and P= 0.001, respectively). Perivascular tumour was not an independent factor predicting OS or RFS.

CONCLUSION

Combining RFA and multipronged EA is a safe and effective treatment for unfavourable HCC, especially for perivascular tumours. A high serum AFP level and multiple tumours had significant negative effects on OS and RFS.

CLINICAL RELEVANCE/APPLICATION

Combined RFA and multipronged EA is a safe and effective modality for unfavorable HCC. Combined RFA and multipronged EA expand the indication of thermal ablation to tumors in diameter of 5cm. High serum AFP level and multiple tumours had a significant negative effect on OS and RFS.

SSG16-05 Ultrasound-Guided Percutaneous RFA in 287 Patients with Isolated Recurrent Hepatocellular Carcinoma: 10-Year Survival Rates and Prognostic Analysis - The Effect of Primary Treatment Modalities on Outcomes

Tuesday, Dec. 3 11:10AM - 11:20AM Room: E260

Participants
Xiu-mei Bai, MD, Beijing , China (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

928612016@qq.com

PURPOSE

The therapeutic outcomes of RFA for recurrent hepatocellular carcinoma (RHCC) after different primary treatment modalities have not been compared. The aim of this study was to assess the long-term outcome of RFA in RHCC and evaluate the effect of primary treatment modalities on outcomes.

METHOD AND MATERIALS

This retrospective study was approved by the institutional review board. Between January 2005 to December 2016, 287 patients who underwent ultrasound guided percutaneous RFA for single RHCC (mean diameter 2.9 cm) were enrolled. Of these 287 patients, 134 patients had RHCC from previous hepatectomy, 128 patients from TACE and the other 25 patients from local ablation therapy. There were 235 males and 52 females with mean age of 60.5 years.

RESULTS

For 287 patients, 336 sessions of RFA were performed. Major complications were observed in 5 patients (2.0%). The technical success was achieved in 95.1% of lesions. Local tumor progression was detected in 42 lesions (14.6%). Local tumor progression rate in RHCC with previous local ablation was significant higher than that in RHCC with previous hepatic resection (28.0% vs 11.9%, P=0.036). The estimated 1-, 3-, 5-, and 10-year OS for RHCC patients after RFA were 92.3%, 73.1%, 58.8%, and 39.6%, respectively. There was no significant difference in OS among the three different primary treatment groups (P=0.777). Based on multivariate analysis, tumor size (P=0.017), Child-Pugh class (P=0.045), portal vein hypertension (P=0.036), and serum alpha fetoprotein level (P=0.018) were associated with OS.

CONCLUSION

RFA is a safe and effective modality with an overall 10-year survival rate of 39.6 % in patients with single RHCC. The primary treatment modality had significant effect on the local tumor progression and OS (only for patient with RHCC > 3cm).

CLINICAL RELEVANCE/APPLICATION

The RHCC patients accounted for more than one of third of RFA cases in our center, most of them received one of the three main treatments, including hepatectomy, TACE or local ablation. So far, few studies reported 10-year survival rates of RFA for RHCC treatment. Also, it is not clear if the primary treatment modalities would impact the long-term outcomes. In our study, the primary objective was to analyze the long-term survival and prognostic factors of RFA in RHCC, and the second objective was to compare the difference in outcome after RFA among different primary treatments.

SSG16-06 Impact of Post-Therapy Prophylaxis on Radiation-Induced Liver Disease

Tuesday, Dec. 3 11:20AM - 11:30AM Room: E260

Participants
Matthias P. Fabritius, MD, Munich, Germany (*Presenter*) Nothing to Disclose
Max Seidensticker, Munich, Germany (*Abstract Co-Author*) Grant, Sirtex Medical Ltd Grant, Bayer AG Grant, Siemens AG Speaker, Sirtex Medical Ltd Speaker, Bayer AG Speaker, Siemens AG
Ricarda Seidensticker, Magdeburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Maclej Pech, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Maclej Powerski, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Holger Amthauer, MD, Magdeburg, Germany (*Abstract Co-Author*) Research Grant, Siemens AG
Jens Ricke, MD,PhD, Berlin, Germany (*Abstract Co-Author*) Research Grant, Sirtex Medical Ltd Research Grant, Bayer AG

For information about this presentation, contact:

matthias.fabritius@med.uni-muenchen.de

PURPOSE

Radioembolization (RE) with yttrium-90 (90Y) resin microspheres is an effective treatment in patients with primary or secondary liver cancer. Radiation-induced liver disease (RILD) is a potentially life-threatening complication with higher prevalence in cirrhotics or patients exposed to previous chemotherapies. This study aimed to evaluate the impact of post-therapeutic RILD-prophylaxis in a relatively homogeneous cohort of liver metastatic breast cancer patients.

METHOD AND MATERIALS

Ninety-three patients with liver metastases of breast cancer received RE between 2007 and 2016. Patients received RILD prophylaxis for 8 weeks post-RE. From January 2014, RILD prophylaxis was changed from ursodeoxycholic acid (UDCA) and prednisolone (standard prophylaxis [SP]; n=59) to pentoxifylline (PTX), UDCA and low-dose low molecular weight heparin (LMWH) (intensified prophylaxis [IP]; n=34). The primary endpoint was toxicity including symptoms of RILD, secondary endpoints included overall survival (OS).

RESULTS

Median OS (95% CI) after RE was 8.0 (6.2-9.8) months. IP (HR 0.47; p=0.033;) and pre-RE alkaline phosphatase >=2 µmol/s.L (HR 2.01; p=0.013) were independent predictors of survival. Subclinical RILD events (bilirubin >=21 µmol/L [but < 30 µmol/L] or ascites) or treatment discontinuations were observed more frequently in the SP group, albeit without significance (5 vs. 1; p=0.397). Symptomatic RILD (bilirubin >=30 µmol/L and ascites) occurred in the SP group only (n=2; p>0.1).

CONCLUSION

Intensified post-therapeutic RILD prophylaxis with PTX, UDCA and LMWH has an independent positive impact on OS in patients with metastatic breast cancer and may reduce RILD frequency and severity.

CLINICAL RELEVANCE/APPLICATION

Radioembolization is an effective treatment in patients with chemotherapy-resistant liver metastases of different primary tumours

Radioembolization is an effective treatment in patients with chemotherapy-resistant liver metastases of different primary tumors as well as primary liver cancer. However, radioembolization may cause injury to the healthy tissues of the liver leading to radiation-induced liver disease (RILD); a potentially life-threatening complication which pathophysiologically resembles venous occlusive disease. Intensive prophylactic (preventative) treatment, with a combination of ursodeoxycholic acid (UDCA) pentoxifylline (PTX), and low-dose low molecular weight heparin (LMWH), has a positive impact on patients' survival and might reduce RILD frequency and severity.

SSG16-07 Local Tumor Control and Survival Rates in Unresectable or Recurrent Hepatic Cholangiocarcinoma (CCC): Transarterial Chemoembolization (TACE) versus Combined TACE and Microwave Ablation (MWA)

Tuesday, Dec. 3 11:30AM - 11:40AM Room: E260

Participants
Thomas J. Vogl, MD, PhD, Frankfurt , Germany (*Presenter*) Nothing to Disclose
Elsayed M. Elhawash, BMedSc,MS, Frankfurt am Main , Germany (*Abstract Co-Author*) Nothing to Disclose
Nagy N. Naguib, MD, MSc, Frankurt, Germany (*Abstract Co-Author*) Nothing to Disclose
Nour-eldin A. Nour-Eldin, MD,PhD, Frankfurt am Main, Germany (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

T.Vogl@em.uni-frankfurt.de

PURPOSE

To evaluate the effect of local targeted liver therapy using transarterial chemoembolization (TACE) with or without microwave ablation (MWA) in patients with unresectable or recurrent cholangiocarcinoma (CCC) regarding overall survival and local tumor control.

METHOD AND MATERIALS

In this retrospective study from January 2007 to December 2017 152 patients (69 males/83 females; mean 58.7 years; range 25-86) with CCC with either unresectable (123/152=80.2%) or recurrent (29/152=19.8%) lesions were treated with at least three sessions (range 3-26) of TACE. Patients were subclassified into non-metastatic (86/152=56.5%), nodal metastatic (39/152=25.7%), systemic metastatic (18/152=11.8%) and both nodal and systemic metastatic (9/152=5.9%). 30 patients received combined TACE and MWA. Follow-up was performed using MRI and CT to evaluate local tumor control according to the modified RECIST criteria and survival was evaluated using the Kaplan-Meier method.

RESULTS

Mean survival for all patients was 28.7 months (CI 21.8-35.7). The survival for patients with non-metastatic, nodal, systemic metastatic and combined metastases was 37, 23.4, 17.5 and 12.4 months, respectively (p value = 0.006). Tumor response after three cycles of TACE was either stable (35.5%), partial response (41.4%) or progressive (23%) and the response at the last follow up was 25.7%, 15.2%, 59.2% and 3.5%, respectively. Patients who received additional MWA showed significantly longer survival vs those with only TACE (median 28 momths and 18 months, respectively, p<0.007). Significant prognostic factors for local tumor control and survival were nodal and/or systemic metastases, pre-therapeutic tumor size, initial local tumor response and additional application of MWA. However, no significant correlation was found between recurrent and unresectable tumors.

CONCLUSION

Local targeted liver therapy of unresectable or recurrent hepatic CCC using TACE or combined TACE and MWA provides an adequate therapeutic option for loca tumor control and improves patient survival

CLINICAL RELEVANCE/APPLICATION

TACE with additional MWA is a promising therapeutic tool in patients with advanced CCC involvement.

SSG16-08 Automated Pattern-Based and Voxelwise Analysis of Lipiodol Deposits on Computed Tomography after Conventional Transarterial Chemoembolization and their Effect on Tumor Response

Tuesday, Dec. 3 11:40AM - 11:50AM Room: E260

Participants
Sophie Stark, Freiburg, Germany (*Presenter*) Nothing to Disclose
Clinton Wang, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Lynn J. Savic, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Brian S. Letzen, MD, Orange, CT (*Abstract Co-Author*) Nothing to Disclose
Isabel T. Schobert, BS, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Milena A. Miszczuk, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Nikitha Murali, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Paula Marie Oestmann, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ming de Lin, PhD, North Haven , CT (*Abstract Co-Author*) Employee, Visage Imaging, Inc; Former Employee, Koninklijke Philips NV
Todd Schlachter, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Guerbet SA
Julius Chapiro, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Guerbet SA; Consultant, Guerbet SA; Research Grant, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Research Grant, Boston Scientific Corporation;

For information about this presentation, contact:

julius.chapiro@yale.edu

PURPOSE

To establish Lipiodol as a theranostic imaging biomarker for therapeutic efficiency of conventional transarterial chemoembolization (cTACE) using automated quantitative and pattern-based image analysis techniques on 24h post cTACE computed tomography (CT).

METHOD AND MATERIALS

This was a retrospective review of prospectively collected clinical trial data including 42 primary and secondary liver cancer patients with 65 tumors treated using cTACE (2012-2018). Hounsfield Unit (HU) thresholds were used to automatically characterize the presence and density of Lipiodol on 24h post cTACE CT scans. Additionally, Lipiodol deposition patterns within a volumetric tumor mask were automatically assessed with regards to homogeneity, sparsity, rim, and peripheral deposition of Lipiodol. Following 3D image registration of baseline (BL) and 1-month follow-up (F/U) MRI to post-TACE CT, Lipiodol deposition was correlated with enhancing tumor volume (ETV) on BL MRI and F/U MRI, using Wilcoxon signed-rank test, Mann-Whitney U test, Kruskal Wallis test, Spearman's rank correlation, and linear regression.

RESULTS

Cut-off values of 87 HU, 155 HU, and 241 HU were found to achieve good separation of areas with low, mid and high Lipiodol density. ETV on BL MRI was significantly correlated with Lipiodol deposition on 24h CT ($p<0.0001$). Tumor regions where Lipiodol was present became necrotic at a higher rate on F/U MRI than areas without Lipiodol ($p=0.0475$). Specifically, ETV decrease in tumor areas with low, mid and high density Lipiodol compared to areas without Lipiodol was -0.87% ± -15.98 ($p=0.3393$), -9.32% ± -22.20 ($p=0.0066$) and -17.91% ± -23.42 ($p=0.0003$), respectively. Moreover, homogeneous ($p=0.0006$), non-sparse ($p<0.0001$), rim deposition within sparse tumors ($p=0.045$), and peripheral deposition ($p<0.0001$) of Lipiodol showed improved response on F/U MRI.

CONCLUSION

In this study, a quantitative automated threshold-based technique was developed and applied to characterize Lipiodol patterns and densities on post-cTACE CT. Strong correlation with radiographic tumor response supports the prognostic value of Lipiodol as an imaging biomarker that can be easily incorporated into the management of liver cancer patients treated using cTACE.

CLINICAL RELEVANCE/APPLICATION

Automated tools to characterize Lipiodol deposition may improve clinical workflow efficiency and allow for a more personalized treatment by earlier identification of non-responders to cTACE.

SSG16-09 Comparison between Percutaneous and Laparoscopic Microwave Ablation of Hepatocellular Carcinoma

Tuesday, Dec. 3 11:50AM - 12:00PM Room: E260

Participants
Angelo Della Corte, MD, Vimodrone, Italy (*Presenter*) Nothing to Disclose
Paolo Marra, Milan, Italy (*Abstract Co-Author*) Nothing to Disclose
Lorenzo Monfardini, Brescia, Italy (*Abstract Co-Author*) Nothing to Disclose
Simone Gusmini, MD, Milan, Italy (*Abstract Co-Author*) Nothing to Disclose
Luca Aldrighetti, MD, Milano, Italy (*Abstract Co-Author*) Nothing to Disclose
Francesco A. De Cobelli, MD, Bergamo, Italy (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

dellacorte.angelo@hsr.it

PURPOSE

Based on patient and nodule characteristics, some authors favor laparoscopic over percutaneous HCC microwave ablation (MWA) , however data are controversial. We compared the two approaches in terms of technical success, complication and local tumor control rates.

METHOD AND MATERIALS

From October 2014 to February 2019, 86 consecutive patients underwent percutaneous or laparoscopic MWA of 98 HCC nodules with a 2450MHz/100W Microwave generator (Emprint, Medtronic). Complete ablation (technical success) and Local Tumor Progression (LTP) at follow-up were assessed by contrast-enhanced CT/MRI. Seventy patients (79 HCC nodules) satisfied inclusion criteria, of which 49 (52 nodules) underwent percutaneous MWA and 21 (27 nodules) underwent laparoscopic MWA.

RESULTS

Baseline analysis showed higher rates of multifocal disease in the laparoscopic group ($p=0.0001$) and higher rates of patients previously treated for HCC in the percutaneous group ($p=0.034$). All other patient and nodules characteristics were homogeneous. Technical success did not significantly differ between the two groups ($p= 0.3$). 7/64 patients (10.9%) suffered procedure-related complications (CIRSE classification grade-3): 2 cases (abscess, haematoma) in the percutaneous group (3.4%) and 5 (pneumothorax, respiratory failure, fever, portal thrombosis, hematoma) in the laparoscopic group (18.5%) ($p=0.02$). 6/79 (7.6%) HCC nodules showed local progression with 1- and 2-year LTPFS rates of 95% and 83.8%, respectively. Five LTPs occurred in the percutaneous group (9.6%), while 1 LTP in the laparoscopic one (3.7%) ($p=0.9$). At logrank analysis, operative approach was not a statistically significant predictor of LTPFS ($p=0.48$). Subgroup analysis showed a trend toward worse LTPFS after percutaneous procedures of subcapsular nodules (2-year LTPFS 100% laparoscopic vs 65.2% percutaneous, $p=0.15$)

CONCLUSION

Higher complication rate in the Laparoscopic group can be explained by the greater technical invasiveness and by the higher rate of multifocal disease treated in one session. Tendency toward better local tumor control in the laparoscopic group when dealing with subcapsular nodules is possibly due to the better visualization and monitoring of the ablation area achieved through laparoscopic guidance.

CLINICAL RELEVANCE/APPLICATION

Despite its higher complication rate, laparoscopic MWA is a an effective therapeutic option and should be considered for treatment of subcapsular HCC.

GIS-TUA

Gastrointestinal Tuesday Poster Discussions

Tuesday, Dec. 3 12:15PM - 12:45PM Room: GI Community, Learning Center

GI

AMA PRA Category 1 Credit ™: .50

Participants

Desiree E. Morgan, MD, Birmingham, AL (*Moderator*) Institutional Research Grant, General Electric Company; Consultant, General Electric Company

Sub-Events

GI337-SD-TUA1 Automated Quantification of Hepatic Steatosis Using Deep Learning in Penn Medicine BioBank Patients

Station #1

Awards

Trainee Research Prize - Medical Student

Participants
Matthew T. MacLean, Philadelphia, PA (*Presenter*) Nothing to Disclose
Qasim Jehangir, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Yi-An Ko, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Marijana Vujkovic, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Julio Chirinos, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Harold I. Litt, MD, PhD, Philadelphia, PA (*Abstract Co-Author*) Research Grant, Siemens AG
Arijitt Borthakur, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Drew A. Torigian, MD, MA, Philadelphia, PA (*Abstract Co-Author*) Co-founder, Quantitative Radiology Solutions LLC
Daniel Rader, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Walter R. Witschey, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Non-alcoholic fatty liver disease (NAFLD) is the most common cause of chronic liver disease affecting one-third of the U.S. adult population. However, the pathogenesis of NAFLD is not well understood and there has been little progress applying precision medicine principles in part due to unknown associations between genetic markers and imaging phenotypes. We developed a fast, fully-automated pipeline to quantify hepatic fat from 25,936 abdominal CT studies and associated it with genetic and phenotypic markers in the Penn Medicine Biobank (PMBB).

METHOD AND MATERIALS

A convolutional neural network (CNN) was trained to segment the liver and spleen using training sets of 124 and 158 abdominal CT studies respectively. DICE coefficients between automatic and manual segmentations were computed on a testing set of 20 studies. Additionally, the CNN derived mean Hounsfield (HU) values were compared to those obtained by manually selecting regions of interest (ROIs). Utilizing cloud computing, these networks generated segmentations on 25,936 studies, representing 10,472 patients. NAFLD was assessed based on the differential attenuation between spleen and liver. A Phenome-Wide association study (PheWAS) was performed to investigate related phenotypes. Additionally, a genome-wide association study (GWAS) was conducted to identify potentially pathogenic single nucleotide polymorphisms.

RESULTS

When compared to manual segmentations, the CNN derived liver and spleen segmentations had DICE coefficients of 0.95 ± 0.02 and 0.92 ± 0.07 respectively. Pearson correlation coefficients of 0.992 and 0.976 were obtained when comparing mean HU between CNN and manually derived ROIs. All 25,936 PMBB studies were processed using cloud computing in less than 48 hours. Using these results, a PheWAS of NAFLD showed the strongest association with the phenotype of chronic nonalcoholic liver disease (p=1e-27) (Figure 1). Other significant associations include Type 2 Diabetes (p=5e-16) and obesity (p=3e-13). A GWAS of NAFLD showed significant associations with genes PNPLA3 and SAMM50.

CONCLUSION

Deep learning when applied to an EHR cohort for retrospective analysis provides an efficient and accurate way to quantify imaging phenotypes.

CLINICAL RELEVANCE/APPLICATION

Automatic quantification of liver fat from abdominal CT may identify genetic factors that predispose to elevated liver fat and allow screening of individual risk prior to disease onset.

GI345-SD-TUA2 Diffusion-Weighted MRI of Surgically Treated Gastrointestinal Stromal Tumor: Associations with Survival and Cell Proliferation Activity

Station #2

Participants
Koichi Hayano, MD, Chiba, Japan (*Presenter*) Nothing to Disclose
Gaku Ohira, Chiba, Japan (*Abstract Co-Author*) Nothing to Disclose

Ryoya Mizumachi, MD, Chiba , Japan (*Abstract Co-Author*) Nothing to Disclose
Atsushi Hirata, Chiba, Japan (*Abstract Co-Author*) Nothing to Disclose
Toru Tochigi, MD, Chiba, Japan (*Abstract Co-Author*) Nothing to Disclose
Hisahiro Matsubara, MD, PhD, Chiba, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Gastrointestinal stromal tumor (GIST) is the most common mesenchymal tumor of the gastrointestinal tract. The malignant potential of GISTs is generally evaluated based on the pathological evaluation of surgical specimen. However, no preoperative biomarker for GIST has been reported yet. On the other hand, diffusion-weighted MRI (DWI) is reported to be a biomarker for various malignant tumors. The purpose of this study is to apply DWI to quantify GIST, and evaluate its biomarker value for predicting survival and proliferation activity of GIST.

METHOD AND MATERIALS

We retrospectively identified 72 patients (35 M / 37 W; median age: 64.5) with GISTs who underwent a preoperative MRI with DWI. Both mean and minimum of apparent diffusion coefficient (ADC) values of the tumor were measured. These tumor parameters were compared with disease-free survival (DFS), the risk classification of GIST (modified Fletcher classification), and Ki 67 index (proliferation marker).

RESULTS

In univariate Cox regression analysis, minimum ADC value of tumor had a significant association with DFS (P=0.004), but mean ADC value didn't. In Kaplan-Meier analysis, patients with lower minimum ADC tumors (minimum ADC < 1.01) showed a significantly worse OS (P=0.04, log-rank). Regarding risk classification, 9 patients were categorized as the high risk, and the other 34 cases were categorized as the very low, low or intermediate risk. High risk GIST showed significantly lower minimum and mean ADC value (P=0.002, 0.04, respectively). Minimum and mean ADC value of tumor showed significant negative correlations with Ki 67 index (P=0.0007, 0.03, respectively).

CONCLUSION

Preoperative tumor ADC can be a useful imaging biomarker of GIST reflecting DFS and proliferation activity.

CLINICAL RELEVANCE/APPLICATION

Currently, there is no established preoperative biomarker to evaluate malignant potential of GIST. But DWI can be a useful non-invasive preoperative biomarker of GIST reflecting survival and proliferation activity, and it would help select an optimal therapy for patients with GISTs.

GI346-SD-TUA3 Spectral CT of Pancreas: Added Value of Virtual Monoenergetic Imaging in the Patients with Pancreatic Ductal Adenocarcinoma

Station #3

Participants
Yasunori Nagayama, MD, Kumamoto, Japan (*Presenter*) Nothing to Disclose
Shota Tanoue, MD, Kumamoto , Japan (*Abstract Co-Author*) Nothing to Disclose
Taihei Inoue, MD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Seitaro Oda, MD, Kumamoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Takeshi Nakaura, MD, Amakusa, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasuyuki Yamashita, MD, Kumamoto, Japan (*Abstract Co-Author*) Consultant, DAIICHI SANKYO Group

For information about this presentation, contact:

y,nagayama1980@gmail.com

PURPOSE

To evaluate the image quality and optimal energies of virtual monoenergetic images (VMI) from spectral-detector computed tomography (SDCT) in multiphasic pancreatic CT, and investigate whether low-keV VMI at the portal-venous-phase (PVP) provides sufficient tumor conspicuity and arterial depiction relative to conventional pancreatic-parenchymal-phase (PPP) images.

METHOD AND MATERIALS

Forty-eight patients with pancreatic ductal adenocarcinoma (PDCA) underwent contrast-enhanced SDCT during PPP and PVP. Conventional polyenergetic images and VMI at 40-100 keV (10-keV increments) were reconstructed at each enhancement phase. Image noise and the contrast-to-noise ratio (CNR) of the pancreas, tumors, arteries and veins were quantified. Two radiologists independently assessed tumor conspicuity, margin delineation, image noise, sharpness of pancreatic duct, and depiction of arteries and veins on a five-point scale. Size-specific dose estimate (SSDE) was calculated.

RESULTS

Image noise for VMI at 40-100 keV was significantly lower than that for convetional images ($p<0.01$). The CNR in VMI increased gradually with decreasing energy; CNRs for VMI at 40-60 keV were significantly greater than that for conventional images ($p<0.01$). All subjective VMI scores were maximized at 40 keV, followed by 50-60 keV; all of which were significantly better than of conventional images ($p<0.01$). Objective and subjective image qualities of 40-50 keV at the PVP were equivalent to or even better compared with conventional PPP images. No significant difference in SSDE was observed between phases ($p=0.10$).

CONCLUSION

SDCT-VMI improved the subjective and objective image quality in multiphasic pancreatic CT for patients with PDAC. Low-keV PVP imaging may yield diagnostically adequate tumor conspicuity and arterial assessment compared with polyenergetic PPP images, potentially allowing the early detection and local staging of incidental PDCA on routine PVP abdominal CT performed for various clinical indications.

CLINICAL RELEVANCE/APPLICATION

Low-keV VMI of the PVP provide sufficient tumor conspicuity and arterial depiction, potentially eliminating the necessity of

dedicated multiphasic scanning for the detection and local staging of PDCA.

GI347-SD-TUA4 Extracellular Contrast-Enhanced MRI with Diffusion-Weighted Imaging for HCC Diagnosis: Prospective Comparison with Gadoxetic Acid

Station #4

Participants
Dong Ik Cha, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Young Kon Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Tae Wook Kang, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Kyoung Doo Song, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Hepatobiliary phase (HBP) is specific to hepatobiliary agent (HBA)-MRI and is reported to improve diagnostic performance for hepatocellular carcinoma (HCC). However, HBP is not available for extracellular agent (ECA)-MRI. The aim of this study was to perform intra-individual comparison of ECA-MRI and gadoxetic acid (HBA)-MRI to determine whether introducing Diffusion-Weighted Imaging (DWI) to ECA-MRI can compensate for the lack of HBP for diagnosing HCC.

METHOD AND MATERIALS

This was a prospective intra-individual comparison study using two different types of contrast agents for liver MRI performed at a tertiary referral academic center. One hundred and forty-seven lesions in 122 patients at high risk for HCC scheduled for liver surgery were included. Sensitivity, specificity, and accuracy of imaging criteria for HCC using conventional and modified criteria of ECA- and HBA-MRI were measured and compared. Modified criteria referred to arterial phase hyperenhancement with diffusion restriction for ECA or hypointensity on TP or HBP for HBA.

RESULTS

Modified ECA-MRI had higher sensitivity and accuracy than modified HBA-MRI [91.0% (111/122) vs. 74.6% (91/122), $p < 0.0001$; and 91.2% (134/147) vs. 75.5% (111/147), $p < 0.0001$, respectively], as well as higher specificity, although the difference did not reach statistical significance [92.0% (23/25) vs. 80.0% (20/25), $p = 0.0833$]. The specificity of modified ECA-MRI was slightly lower than both conventional criteria but without a significant difference [92.0% (23/25) vs. 100% (25/25), $p = 0.1573$].

CONCLUSION

Modified criteria for ECA-MRI using diffusion restriction showed better sensitivity and accuracy than modified criteria of HBA-MRI using hypointensity on TP or HBP, without significantly compromising specificity compared with conventional EASL criteria of ECA- or HBA-MRI.

CLINICAL RELEVANCE/APPLICATION

ECA exhibited arterial phase hyperenhancement more frequently than HBA. In addition, modified criteria for ECA-MRI using diffusion restriction showed the best sensitivity and accuracy than other criteria without compromising specificity compared with conventional criteria. Diffusion restriction on ECA-MRI seems to be able to overcome the lack of HBP

GI392-SD-TUA5 Does the Change in Volumetric Functional MR Metrics Post-TACE Predict Histopathologic Grading of Hepatocellular Carcinoma?

Station #5

Participants
Sanaz Ameli, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Roya Rezvani Habibabadi, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Robert Grimm, Erlangen, Germany (*Abstract Co-Author*) Employee, Siemens AG Stockholder, Siemens AG Patent holder, Siemens AG
Li Pan, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Robert Anders, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

sameli1@gmail.com

PURPOSE

To evaluate whether the change in volumetric ADC (vADC) and volumetric venous enhancement (vVE) after transarterial chemoembolization (TACE) can predict the histologic grading of hepatocellular carcinoma (HCC).

METHOD AND MATERIALS

This HIPPA compliant retrospective study was approved by our institutional review board. The study population included 103 HCC patients (128 index lesions) who had MR imaging within 6 months before and 6 months after TACE and pathologic report of the HCC either by biopsy or liver transplantation/resection between 2001 and 2017. Volumetric measurements of venous enhancement (VE) and apparent diffusion coefficient (ADC) were performed on the baseline and post TACE MRI. The tumors were histologically classified into two low-grade and high-grade groups. The parameters between the two groups were compared using bivariate analysis.

RESULTS

Total of 103 patients with a median age of 61(58-67) was evaluated. 82 were male and 21 were female. Median change in vADC

and vVE after TACE was higher in low-grade HCC as compared to high-grade HCC (p=0.000 and p=0.002, respectively). Setting the cutoff value of 136.9 (10 -6 mm2/s) for vADC change resulted in the highest sensitivity and specificity (of 79% and 70%, respectively) in distinguishing between the 2 groups. vVE change at the cutoff point of -19.39 could differentiate between the two groups with the sensitivity and specificity of 77% and 50%, respectively.

CONCLUSION

Changes in volumetric functional MRI metrics are more dramatic in low-grade HCCs in response to TACE as compared to high-grade HCCs.

CLINICAL RELEVANCE/APPLICATION

Using volumetric changes of functional MRI in TACE-treated HCCs can be utilized as a non-invasive alternative in predicting tumor grading and can help clinicians to better plan treatment in HCC patients.

GI393-SD-TUA6 Magnetic Resonance Imaging as a Non-Invasive Method for the Assessment of Pancreatic Fibrosis (MINIMAP): A Comprehensive Study Design from the Consortium for the Study of Chronic Pancreatitis, Diabetes, and Pancreatic Cancer

Station #6

Participants
Temel Tirkes, MD, Indianapolis, IN (*Presenter*) Nothing to Disclose
Sudhakar K. Venkatesh, MD, FRCR, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Anil K. Dasyam, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Ely R. Felker, MD, Los Angeles, CA (*Abstract Co-Author*) Nothing to Disclose
Zarine K. Shah, MD, Columbus, OH (*Abstract Co-Author*) Nothing to Disclose
Naoki Takahashi, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Ashley M. Wachsman, MD, W Hollywood, CA (*Abstract Co-Author*) Nothing to Disclose
Shreyas S. Vasanawala, MD, PhD, Palo Alto, CA (*Abstract Co-Author*) Research collaboration, General Electric Company; Consultant, Arterys Inc; Consultant, Inkspace; Research Grant, Bayer AG;
Luis F. Lara, MD, Columbus, OH (*Abstract Co-Author*) Nothing to Disclose
Evan L. Fogel, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

atirkes@iupui.edu

PURPOSE

Characteristic features of chronic pancreatitis (CP) may be absent on standard imaging studies. Quantitative Magnetic Resonance Imaging (MRI) techniques such as T1 mapping, extracellular volume (ECV) fraction, diffusion-weighted imaging (DWI) with apparent diffusion coefficient map (ADC), MR elastography (MRE) and T1-weighted signal intensity ratio (SIR) have shown promise for the diagnosis and grading severity of CP. However, radiologists still use the Cambridge classification which is based on traditional ductal imaging alone. There is an urgent need to develop new diagnostic criteria that incorporate both parenchymal and ductal features of CP as illustrated by MRI/MRCP. Designed to fulfill this clinical need, we present the MINIMAP study, which was funded in September 2018 by the National Institutes of Health. We hypothesize that quantitative MR imaging combined with ductal features can serve as valuable non-invasive imaging biomarkers to detect and grade CP.

METHOD AND MATERIALS

This is a prospective quantitative MR imaging study which will be performed at 7 institutions in well-phenotyped CP patient cohorts. The study will enroll 180 patients, composed of equal numbers (n=60) of no pancreas disease controls, and patients with suspected or definite CP. We will evaluate the role of T1 relaxometry, ECV, T1-weighted gradient echo SIR, MRE, arterio-venous enhancement ratio, ADC, pancreas volume/atrophy, pancreatic fat fraction, ductal features and pancreatic exocrine output following secretin stimulation in the assessment of CP. We will attempt to generate a multi-parametric pancreatic tissue fibrosis (PTF) scoring system.

RESULTS

Will not be available until December.

CONCLUSION

Will be published at the completion of the study.

CLINICAL RELEVANCE/APPLICATION

There is an urgent need to develop new diagnostic criteria that incorporate both parenchymal and ductal features of CP as illustrated by MRI/MRCP. We anticipate that a quantitative scoring system may serve as a biomarker of pancreatic fibrosis, hence this imaging technique can be used in clinical practice as well as clinical trials to evaluate the efficacy of agents which may slow the progression or reverse measures of CP.

GI394-SD-TUA7 Influence of Sequence Selection of MR Enterography Diagnostic Accuracy

Station #7

Participants
Gauraang Bhatnagar, FRCR,MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose
Laura Quinn, Birmingham, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Richard A. Beable, MBChB, Portsmouth, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Rebecca Greenhalgh, MBBS, FRCR, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Anthony Higginson, Portsmouth, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Rajapandian Ilangovan, MD, FRCR, Northwood, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Hannah Lambie, Bradford, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Evgenia Mainta, MD, MMedSc, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Uday B. Patel, MBBS, BSc, Sutton, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Francois Porte, MBBS, BSc, Tunbridge Wells, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Harbir S. Sidhu, FRCR, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

Andrew Slater, MBBCh, Oxford, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Damian J. Tolan, MBBCh, FRCR, Leeds, United Kingdom (*Abstract Co-Author*) Speaker, Bracco Group Speaker, Merck & Co, Inc
Ian A. Zealley, MBChB, Perth, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Steve Halligan, MD, Herts, United Kingdom (*Abstract Co-Author*) Research Consultant, iCad, Inc
Sue Mallett, DIPLPHYS,MS, Birmingham, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Stuart A. Taylor, MBBS, Great Missenden, United Kingdom (*Abstract Co-Author*) Research Consultant, Robarts Clinical Trials, Inc; Shareholder, Motilent

For information about this presentation, contact:

g.bhatnagar@nhs.net

PURPOSE

To evaluate the impact of individual MRE sequences on diagnostic accuracy for small bowel Crohn's disease.

METHOD AND MATERIALS

The study utilised data from a prospective trial comparing the diagnostic accuracy of MRE and US for CD (either newly diagnosed or with relapsing disease) recruited across 8 hospitals. A construct reference standard (multidisciplinary panel diagnosis) was used in the trial, incorporating 6 months of patient follow up. 73 (28 new diagnosis, 45 suspected relapse) trial MREs were interpreted by one of 27 radiologists using a locked sequential read paradigm via an online viewing platform (Biotronics 3Dnet). For the first read, only T2 weighted images were reviewed. The second read added 2 b value diffusion weighted images (DWI) and the final read added contrast enhanced T1 images. After each read, radiologists recorded the presence and location of small bowel Crohn's disease. Sensitivity and specificity for small bowel disease extent (i.e. presence and correct segmental location) was compared to the trial construct reference standard by bootstrapping with replacement by patient 1,999 times, taking an average value over the bootstrapped datasets (STATA 14.2).

RESULTS

T2 weighted images alone were 63% sensitive (95%CI 51-75%) and 79% specific (57-100%) for small bowel disease extent. Addition of DWI did not significantly increase sensitivity (61% [95%CI 47-73%), difference -2% [-8 to -4]), or specificity (79% [57-100%], difference 0%). Conversely, compared to T2 weighted images alone, addition of a combination of both diffusion weighted and contrast enhanced images significant reduced sensitivity by 7% (95% CI -1 to -14).

CONCLUSION

Addition of DWI does not increased sensitivity for small bowel disease extent compared to T2 weighted images alone. Addition of T1 contrast enhanced images reduces sensitivity suggesting they may falsely reassure radiologists suspecting disease based on T2 weighted images.

CLINICAL RELEVANCE/APPLICATION

For small bowel disease detection, streamlined MRE protocols avoiding cannulation and gadolinium exposure may be sufficient.

GI395-SD-TUA8 Prediction of Liver Fibrosis Using T1ρ and T2 Relaxations

Station #8

Participants
Yukihisa Takayama, MD, Fukuoka, Japan (*Presenter*) Nothing to Disclose
Akihiro Nishie, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshiki Asayama, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasuhiro Ushijima, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomohiro Nakayama, MD, PhD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yuichiro Kubo, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Keisuke Ishimatsu, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomoharu Yoshizumi, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the diagnostic performance of liver fibrosis stage using T1ρ relaxation in comparison with T2 relaxation

METHOD AND MATERIALS

Eighty-three patients (F/M = 29/54, mean age, 69.4 yrs) with liver tumor were scanned MRI including T1ρ and T2 maps before the surgery. Among 83 patients, 67 patients had a history of chronic liver disease. but other 16 patients did not. All patients were classified into five stages (F0, n=21; F1, n=12; F2, n=20; F3, n=6 and F4, n=24) referring to the pathological examination of surgically resected specimens of the liver. Averaged T1ρ and T2 values of the liver parenchyma of each patient were measured after drawing three regions of interest on both maps. The Spearman correlation coefficient was calculated between T1ρ and liver fibrosis stages, and between T2 value and liver fibrosis stages. The performances in diagnosing cirrhosis (F4 vs F0-3), advanced fibrosis (F3-4 vs F0-2), clinically significant fibrosis (F2-4 vs F0-1), and with or without fibrosis (F1-4 vs. F0) were evaluated using a receiver operating characteristic (ROC) analysis.

RESULTS

Mean T1ρ values of five stages were as follow: F0, 51.2 ms; F1, 52.0 ms; F2, 52.5 ms; F3, 61.9 ms and F4, 62.8 ms, respectively. Mean T2 values of five stages were as follow; F0, 37.2 ms; F1, 37.0 ms; F2, 37.9 ms; F3, 39.9 ms and F4, 43.3 ms, respectively. The Spearman correlation coefficients of T1ρ and T2 values were 0.55 and 0.51, respectively ($p<0.05$). ROC analysis showed the area under the curves (AUCs) of T1ρ for diagnosing cirrhosis (F4), advanced fibrosis (F3 or greater), and significant fibrosis (F2 or greater), with fibrosis (F1 or greater) were 0.82, 0.86, 0.75 and 0.69, respectively ($p<0.05$). In addition, ROC analysis showed the AUCs of T2 for diagnosing cirrhosis, advanced fibrosis, and significant fibrosis, with fibrosis were 0.82, 0.80, 0.71 and 0.64, respectively ($p<0.05$). However, there were no significant differences in AUCs between T1ρ and T2 values.

CONCLUSION

T1ρ relaxation, as well as T2 relaxation, has potential as a biomarker to predict liver fibrosis stage.

CLINICAL RELEVANCE/APPLICATION

T1ρ and T2 relaxations may help clinicians for the non-invasive prediction of liver fibrosis stage in patients with chronic liver disease.

GI396-SD-TUA9 Comparison between ROI-Based and Volumetric Measurements of Liver Fibrosis Using MR Elastography in Quantifying Heterogeneity of Liver Stiffness

Station #9

Participants
Roya Rezvani Habibabadi, Baltimore, MD (*Presenter*) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Sanaz Ameli, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

rrezvan3@jhmi.edu

PURPOSE

To compare ROI-based and volumetric measurements in quantifying heterogeneity of liver stiffness (LS) using MRE.

METHOD AND MATERIALS

In this retrospective, IRB approved study, 128 patients with suspected liver fibrosis and MRE were reviewed between 12/2016 and 12/2017. LS was measured using: 1) the average of 3 Regions of interest (ROI), and 2) volumetric segmentation of the entire liver parenchyma (excluding vessels) using a semi-automatic software. Mean LS (MLS) of the 2 methods was calculated for each patient. Stages of fibrosis were defined using previously tested thresholds. Each patient was assigned to one of the 5 stages of fibrosis (MLS-stage)based on their ROI-MLS. Volumetric measurement of stiffness maps was also used to calculate the full range of LS and percentage involvement of the liver with each stage of fibrosis. Accordingly, specific proportions were defined: 1) above MLS-stage: percentage of the liver that has LS at least one category higher than MLS-stage, and 2) the first and second most predominant stages of fibrosis. Heterogeneous stiffness was defined when the first and second most predominant stages were more than one category apart.

RESULTS

The mean age of patients was 54 ±15 years; 46% were female. The average of MLS was 2.72 ±1.03 kPa for ROI measurements and2.64 ±0.93 kPafor volumetric method (p=0.001).As per MLS-stage,59 (46 %), 19 (15 %), 13 (10 %), 26 (20%) and 11 (8%) patients were assigned to stages F0, F1, F2, F3, and F4.In 58 patients (45%), more than 20% of liver had stiffness at least one stage higher than MLS-stage. Among 59 patients with normal MLS-stage (F0), 31 patients (53%) had >20% of liver volume with abnormal LS (F1-F4). In all 128 patients, an average of 20% of the liver volume had stiffness at least one stage higher than each individuals' MLS-stage. By definition,18 patients (14%) were identified to have heterogeneous stiffness.

CONCLUSION

Heterogeneity of hepatic fibrosis may occur in patients with chronic liver disease. MLS may not represent the entire spectrum of hepatic fibrosis. Failure to detect heterogeneity in its early stage could cause a delay in treatment initiation and progression of fibrosis.

CLINICAL RELEVANCE/APPLICATION

Volumetric segmentation and descriptive reporting of LS can potentially improve the detection of heterogeneous fibrosis in the liver and the accuracy of LS measurement. It helps to establish a more timely and precise management plan for each patient.

GI397-SD-TUA10 Pilot Study to Assess Feasibility of Fast Whole-Body MRI Imaging in Oncologic Screening

Station #10

Participants
Maryam Ghadimi, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Sanaz Ameli, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Roya Rezvani Habibabadi, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Li Pan, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Vikash Gupta, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

mghadim1@jhu.edu

PURPOSE

Assess the feasibility of whole-body MRI imaging in 30 minutes in oncologic applications.

METHOD AND MATERIALS

Our IRB approved this HIPPA-compliant prospective study. Twenty-six adult patients assessed for metastatic diseases were scanned with WB-DWI methods using a 3T MRI scanner. Axial fat-suppressed T2-weighted (T2WI), DWI, precontrast TS T1-weighted (T1WI) followed by post contrast FS T1WI in the arterial, portal venous and delayed phases were acquired (gradient time of 30 minutes). A single reader utilizing a five-point-scale recorded image quality of each WB-MRI study. Findings on whole-body MRI were recorded. The number of lesions was compared to those detected on CT or PET-CT studies, performed with 12 months of whole-body MRI if available. The WB-MRI, CT, and PET-CT were divided into standard anatomical location including chest, abdomen, and pelvis. The number of lesions within each anatomic location was compared in all three modalities.

RESULTS

Our study included 14 males and 12 females with the mean (±standard deviation) age of 55(±14) years. All whole-body MRI examinations were successfully obtained in the median time of 35 (IQR, 29-39) minutes. There were 17,21 and 8 lesions detected from chest, abdomen and pelvis, respectively in CT studies (N=19). Additionally, total of 0, 3, 2 lesions were detected in the chest, abdomen and pelvis respectively by assessing PET-CT studies (N=5). The WB-MRI detected 15 Lesions in chest, 38 Lesions in abdomen and 8 lesions in pelvis. All lesions detected on PET-CT were also detected on WB-MRI. Four lesions (16%) detected on WB-MRI in abdomen parts were missed on CT, while WB-MRI missed 2 lesions (11%) detected by CT in the chest parts; all were less than 10 mm. These two studies are comparable in detecting lesions in the pelvis. The overall image quality of whole-body MRI was 4/5.

CONCLUSION

We have demonstrated that fast multiparametric WB-MRI may be preformed in approximately 30 minutes, with relatively high image quality. Lung lesions <10mm may not be readily detected by WB-MRI.

CLINICAL RELEVANCE/APPLICATION

Whole-body MRI might be an acceptable alternative for CT or PET, in staging, assessment and monitoring of treatment response in oncologic applications.

GI297-ED-TUA11 MRI Evaluation of Pathological Complete Response of Locally Advanced Rectal Cancer after Neoadjuvant Chemoradiation Therapy: Can We Wait and What Will We Watch?

Station #11

Awards
Identified for RadioGraphics

Participants
Qiaoyu Xu, BMedSc,MMed, Beijing, China (*Presenter*) Nothing to Disclose
Hongliang Sun, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Tao Jiang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yanyan Xu, MD, Okinawa, Japan (*Abstract Co-Author*) Nothing to Disclose
Sheng Xie, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

stentorsun@gmail.com

TEACHING POINTS

1. To describe the pathological complete response (pCR) of locally advanced rectal cancer(LARC) after Neoadjuvant Chemoradiation therapy, and the "watch-and-wait" strategy. 2. To describe the challenge and utilitys of MRI in evaluation of pCR in LARC. 3. To discuss the role of MRI in prediction of pCR, the planning of surgery and therapeutic protocols. 4. To discuss the future directions of MRI accurately evaluation of pCR in LARC.

TABLE OF CONTENTS/OUTLINE

1. Why and what kind of patients with locally advanced rectal cancer should be suggested a "watch-and-wait" strategy? 2. The necessity and challenges of accurately evaluating pCR. 3. MRI predictors that may be used to evaluate pCR after neoadjuvant chemoradiation therapy. 4. MRI predictors that may be used to predict pCR, and the benefits of early predicting pCR. 5. Combining the MRI predictors demonstrated accurately evaluating and predicting pCR. 6. Comparison between using MRI and pathological methods to evaluate pCR. 7. The limitation of current MRI method and future direction.

GI295-ED-TUA12 Imaging in the Evaluation of Potential Living Donor for Liver Transplantation

Station #12

Participants
Vincenzo Carollo, MD, Palermo, Italy (*Presenter*) Nothing to Disclose
Giuseppe Mamone, MD, Palermo, Italy (*Abstract Co-Author*) Nothing to Disclose
Christine J. Cannataci, MD, Msida, Malta (*Abstract Co-Author*) Nothing to Disclose
Kelvin Cortis, MD,FRCR, Msida, Malta (*Abstract Co-Author*) Nothing to Disclose
Luigi Maruzzelli, MD, Palermo, Italy (*Abstract Co-Author*) Nothing to Disclose
Mariapina Milazzo, Palermo, Italy (*Abstract Co-Author*) Nothing to Disclose
Settimo Caruso, Palermo, Italy (*Abstract Co-Author*) Nothing to Disclose
Francesca Crino, Palermo, Italy (*Abstract Co-Author*) Nothing to Disclose
Ambra Di Piazza, MD, Palermo , Italy (*Abstract Co-Author*) Nothing to Disclose
Gianluca Marrone, MD, Palermo, Italy (*Abstract Co-Author*) Nothing to Disclose
Giovanni Gentile, Palermo, Italy (*Abstract Co-Author*) Nothing to Disclose
Roberto Miraglia, MD, Palermo, Italy (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

vcarollo@ismett.edu

TEACHING POINTS

To describe the salient multimodality (US, CT and MRI) imaging findings in liver donors which allow for the identification of normal and abnormal anatomy pathological conditions which may preclude transplantation

TABLE OF CONTENTS/OUTLINE

- Delineate the range of indications for liver transplantation. - Outline the surgical technique in harvesting the donor liver. - Describe advantages of living donor liver transplantation. - Demonstrate multimodality imaging findings in the pre-operative assessment of a potential liver donor: Ultrasound is usually the first imaging modality for evaluation of potential donors because it can identify hepatic lesions, obtain important information on the anatomy of the great vessels, such as hepatic veins and portal system, and evaluate the presence of steatosis. CT is used for precise anatomic assessment of the hepatic artery, portal and hepatic veins, to accurately calculate volume of both liver lobes, to identify focal liver lesions and diffuse liver disease (steatosis, haemochromatosis) and to identify extrahepatic incidental findings. MR cholangiography is considered the primary imaging tool for biliary anatomy evaluation in potential living liver donors. MRI is also used to accurately calculate the presence of steatosis and to identify and characterize focal lesions.

GI296-ED-TUA13 Morison's Pouch: Anatomical Background, Pathologies, and Spread of Disease on Cross Sectional Imaging

Station #13

Awards

Certificate of Merit

Participants
Sameh Nassar, MBBCh, Houston, TX (*Presenter*) Nothing to Disclose
Katherine J. Blair, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Akram M. Shaaban, MBBCh, Salt Lake City, UT (*Abstract Co-Author*) Contributor, Reed Elsevier; Author, Reed Elsevier
Ayman Nada, MD, PhD, Cairo, MO (*Abstract Co-Author*) Nothing to Disclose
Meghan G. Lubner, MD, Madison, WI (*Abstract Co-Author*) Grant, Koninklijke Philips NV; Grant, Johnson & Johnson;
Vincent M. Mellnick, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Ayman H. Gaballah, MD, FRCR, Columbia, MO (*Abstract Co-Author*) Nothing to Disclose
Khaled M. Elsayes, MD, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

kmelsayes@mdanderson.org

TEACHING POINTS

1. Demonstrate the anatomical details and boundaries of the Morison's pouch. 2. List the various disease processes related to Morison's pouch and potential route of disease spread. 3. Discuss the spectrum of common and uncommon Morison's pouch related pathological processes. 4. Describe typical and atypical imaging features of these lesions with pathologic correlation 5. Illustrate a pattern recognition approach to help reach a specific diagnosis.

TABLE OF CONTENTS/OUTLINE

- Anatomical background of Morison's pouch. - Pathological background. - Pathway of disease spread. - Common and uncommon pathologies including: fluid collection (e.g. transudate in case of cirrhosis and ascites, exudate in case of inflammatory causes, hematoma in case of trauma), soft tissue infiltrations (e.g. inflammatory haziness of the fat planes and invasion of neoplastic lesions), and metastatic (e.g. peritoneal deposits). - Current surgical and non-surgical management options of these pathological entities. - Differential diagnoses and summary.

GI300-ED-TUA14 Single-Energy CT Subtraction and Iodine Enhancement Map: Protocol and Abdominal Applications

Station #14

Participants
Felipe L. Costa, MD , Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Nicolau F. Guerreiro, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Alexandre M. Pereira, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Natally Horvat, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Publio C. Viana, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Giovanni G. Cerri, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

felipe.lobato@live.com

TEACHING POINTS

• Describe the protocol and image manipulation to perform a single energy CT subtraction and digital iodine enhancement map.• Show how CT subtraction and iodine enhancement map can aid radiologist to detect subtle lesions, whether there is enhancement within a lesion and how it may facilitate clinician image understanding.

TABLE OF CONTENTS/OUTLINE

• CT subtraction protocol.• CT iodine enhancement map protocol.• Cased based examples on how CT subtraction and iodine enhancement map can help radiologist:- Patient with liver metastasis of colonic adenocarcinoma showing how CT subtraction and iodine enhancement map can help radiologist and clinician in a single image stack to recognize which nodules still show enhancement after treatment.- Dubious pancreatic nodule on conventional CT images, better depicted on CT subtraction and iodine enhancement map, confirmed to be a nodule in endoscopic ultrasound and a biopsy proven adenocarcinoma.- Patient with small (1 cm) renal cortical hyperattenuating formation, undetermined in conventional CT images, that when analyzed on CT subtraction and iodine enhancement added concern to be solid. MRI confirmed to be a solid nodule with enhancement.• Discuss the perspectives for CT subtraction and iodine enhancement map application in routine.

GI298-ED-TUA15 Abdominal Complications After Lung Transplantation

Station #15

Participants
Irene Navas Fdez-Silgado, MD, Madrid, Spain (*Presenter*) Nothing to Disclose
Elena Martinez Chamorro, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Susana Borruel, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Lain Ibanez, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Carlos Fernandez Cabrera, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Alejandro Marin, MD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

inavas1991@gmail.com

TEACHING POINTS

1. To review the gastrointestinal complications after lung transplantation: incidence, type and management. 2. To learn important findings to detect these complications with abdominal CT and when to suspect them. 3. To emphasize the importance of detecting these potential complications early.

TABLE OF CONTENTS/OUTLINE

1. Introduction of lung transplantation and its abdominal complications. 2. Incidence of each type complication. 3. Types of complication: when it occur (early postoperative vs long-term morbidity) and its severity (minor and mayor): - Acute cholecystitis - Perforation and obstruction - Colitis (ischemic and infectious) -Others: symptomatic gastro-esophageal reflux disease, gastroparesis, peptic ulcer disease, pancreatitis (acalculous and probably related to immunosuppression), diverticulitis, hepatitis, appendicitis 4. CT findings and pitfalls. 5. Management and outcome of these patients.

Printed on: 10/29/20

GIS-TUB

Gastrointestinal Tuesday Poster Discussions

Tuesday, Dec. 3 12:45PM - 1:15PM Room: GI Community, Learning Center

CT GU MR OI GI

AMA PRA Category 1 Credit ™: .50

FDA Discussions may include off-label uses.

Participants

Desiree E. Morgan, MD, Birmingham, AL (*Moderator*) Institutional Research Grant, General Electric Company; Consultant, General Electric Company

Sub-Events

GI348-SD-TUB1 Radiomic Analysis of Contrast-Enhanced CT Predicts Microvascular Invasion and Outcome in Hepatocellular Carcinoma

Station #1

Participants
Xun Xu, Nanjing, China (*Presenter*) Nothing to Disclose
Hai-Long Zhang, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Yu-Dong Zhang, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Xi-Sheng Liu, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Microvascular invasion (MVI) impairs surgical outcomes in hepatocellular carcinoma (HCC) patients. As a single highly reliable factor to preoperatively predict MVI is lacking, we developed a computational approach integrating large-scale clinical and imaging modalities, especially radiomic features from contrast-enhanced CT, to predict MVI and clinical outcomes in HCC patients.

METHOD AND MATERIALS

In total, 495 surgically resected patients were retrospectively included. MVI-related radiomic scores (R-scores) were built from 7,260 radiomic features in six target volumes. Six R-scores, 15 clinical factors, and 12 radiographic scores were integrated into a predictive model, the Radiographic-Radiomic (RR) model, with multivariate logistic regression.

RESULTS

Radiomics related to tumor size and intratumoral inhomogeneity were the top-ranked MVI predicting features. The related R-scores showed significant differences according to MVI status ($p < 0.001$). Regression analysis identified 8 MVI risk factors, including 5 radiographic features and a R-score. The R-score (odds ratio [OR], 2.34) was less important than tumor capsule (OR, 5.12), tumor margin (OR, 4.20), and peritumoral enhancement (OR, 3.03). The RR model using these predictors achieved an area under curve (AUC) of 0.909 in training/validation and 0.889 in the test set. Progression-free survival (PFS) and overall survival (OS) were significantly different between the RR-predicted MVI-absent and MVI-present groups (median PFS: 49.5 vs. 12.9 months; median OS: 76.3 vs. 47.3 months). RR-computed MVI probability, histologic MVI, tumor size, and Edmondson-Steiner grade were independently associated with disease-specific recurrence and mortality.

CONCLUSION

The computational approach integrating large-scale clinicoradiologic and radiomic features demonstrates good performance for successfully predicting MVI and disease clinical outcomes, but radiomics with current CT imaging analysis protocols do not provide statistically significant added value to radiographic scores.

CLINICAL RELEVANCE/APPLICATION

The R-score, together with 7 clinico-radiologic biomarkers, forms a set of independent predictors of histologic MVI of HCC; and the R-score does not provide statistically significant added value to radiologist scores in predicting MVI.

GI349-SD-TUB2 Hepatocellular Carcinoma with Hilar Bile Duct Tumor Thrombus Versus Hilar Cholangiocarcinoma on Enhanced Computed Tomography: A Diagnostic Challenge

Station #2

Participants
Xiaoqi Zhou, Guangzhou, China (*Presenter*) Nothing to Disclose
Jifei Wang, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Mengqi Huang, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Zhenpeng Peng, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Shiting Feng, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Ziping Li, MD, PhD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Hepatocellular carcinoma (HCC) with hilar bile duct tumor thrombus (HBDTT) often mimic hilar cholangiocarcinoma (hilar CC). The purpose of this study is to analyze the Computed Tomography (CT) characteristics of HCC with HBDTT and to identify imaging features to aid its differentiation from hilar CC on enhanced CT.

METHOD AND MATERIALS

We retrospectively identified 58 cases with pathologically proved HCC with HBDTT between 2011 and 2018. 53 cases of pathologically proven hilar CCs were randomly selected during the same period. The clinical features and CT findings of the two groups were reviewed and compared.

RESULTS

HCC with HBDTTs are more commonly found in men (87.9% vs 67.9%; $p = 0.011$) with lower onset age (49.84 vs 59.55 years; $p < 0.001$) in comparison to hilar CCs. Correlation were find between HCC with HBDTTs and chronic HBV infection (72.4% vs 11.3%, $p < 0.001$), increasing of serum AFP level (67.2% vs 1.9%; $p < 0.001$), CA19-9 level (58.6% vs 88.7%; $p < 0.001$) and CEA level (3.4% vs 26.4%; $p = 0.001$), parenchymal lesion with intraductal lesion (100% vs 13.2%; $p < 0.001$),washout in portal venous phase (84.5% vs 5.7%; $p < 0.001$), thickened bile duct wall (8.6% vs 94.3%; $p < 0.001$), intrahepatic vascular embolus (44.8% vs 5.7%; $p < 0.001$), splenomegaly (34.5% vs 0.0%; $p < 0.001$). A scoring system consisting of the five parameters mentioned above was trialed. The sensitivity and specificity for diagnosing HCC with HBDTT were 96.39%, 100% and 92.5% respectively when the total score was 2 or more.

CONCLUSION

HCC with HBDTTs are often distinguishable from hilar CCs based on washout in portal venous phase without thickened bile duct wall. HBV infection and serum AFP level facilitate the differentiation.

CLINICAL RELEVANCE/APPLICATION

Enhanced CT could help differentiate HCC with HBDTT from hilar CC and is recommended to be carefully evaluated in the preoperative examination.

GI350-SD-TUB3 Iodine Map Imaging Using Dual-Energy CT has Ability to Evaluate the Severity of Liver Fibrosis

Station #3

Participants
Kaoru Katori, Tokyo, Japan (*Presenter*) Nothing to Disclose
Tomoki Fujii, MS,RT, Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose
Hirotaka Hamada, Shinagawa-ku, Japan (*Abstract Co-Author*) Nothing to Disclose
Hisaya Sato, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose
Kyouichi Katou, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Liver biopsy is the gold standard for diagnosis of the degree of fibrosis in the liver. However, liver biopsy is invasive and it causes the possibility of adverse events. Therefore, new noninvasive methods are required. In recent years, Dual Energy CT (DECT) has appeared, and it has become possible to measure iodine concentration quantitatively by iodine map analysis. Focusing on the iodine map analysis of DECT, we examined whether iodine map analysis could be possible to evaluate the severity of liver fibrosis.

METHOD AND MATERIALS

The subjects were 120 participants who were diagnosed with normal liver, hepatitis, and cirrhosis since January 2016 to March 2018. All participants underwent a contrast enhanced CT examination with DECT. ROI was set in the liver (1 point in the left lobe, 2 points in the right lobe) and the spleen (2 point in the spleen parenchyma). The iodine concentration ratio of liver and spleen (H/S ratio) was calculated with the obtained iodine concentration. As the statistical analysis, the relationship between H/S ratio and severity of liver fibrosis was analyzed using t-test. In addition, the correlations between H/S ratio and biomarker of liver fibrosis such as Platelets and Fibrosis 4 index (FIB-4) were assessed using univariate linear regression analysis.

RESULTS

H/S ratio was significantly decreased with severity of liver fibrosis (H/S ratio; normal liver 0.94 ± 0.14, hepatitis 0.81 ± 0.11, and cirrhosis 0.60 ± 0.10). H/S ratio was also correlated with Platelets and FIB-4 ($p<0.0001$ of both; $r=0.4850$, 0.5180, respectively).

CONCLUSION

Iodine map of DECT may be able to assess the severity of liver fibrosis.

CLINICAL RELEVANCE/APPLICATION

Iodine map analysis using DECT has ability to assess the severity of liver fibrosis.

GI398-SD-TUB4 Macro Regenerative Nodules in PSC Disease: MRI Features

Station #4

Participants
Beatrice L. Madrazo, MD, Miami, FL (*Abstract Co-Author*) Nothing to Disclose
Leonardo Pisani, MD, Atlanta, GA (*Presenter*) Nothing to Disclose
Andres Morgado-Laureano, MD, Miami, FL (*Abstract Co-Author*) Nothing to Disclose
Ingrid Schwartz, Miami, FL (*Abstract Co-Author*) Nothing to Disclose
Priscila Santiago, Miami, FL (*Abstract Co-Author*) Nothing to Disclose
Emmanuel Thomas, MD,PhD, Miami, FL (*Abstract Co-Author*) Nothing to Disclose
Cynthia Levy, MD, Miami, FL (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

bmadrazo@med.miami.edu

PURPOSE

This present study describes the features of macro regenerative nodules (MRN) on Magnetic Resonance Imaging (MRI) in patients with Primary Sclerosing Cholangitis.

METHOD AND MATERIALS

Retrospective study approved by the ethics committee of the institution. Patients with diagnosis of PSC with at least one MRI between 2000 and 2018 were gathered from the institution database. Cases were reviewed by 2 radiologists for all MRI imaging studies of each patient. Clinical data was collected regarding first and last study dates.

RESULTS

A total of 97 patients with PSC were included and 190 imaging studies were reviewed. 52 patients (54%) were male and the most prevalent race was Caucasian (74%). Median disease duration at first MRI was 4.9 years (range 0.03-49.1). MRN were perceived as hypertrophic nodules of the liver with discrepancy in signal in at least one sequence and with architectural distortion of surrounding area. Frequency of MRN was 64.9% (63 patients) in the first study. A frequency of 62.2% (38 patients) with MRN on both first and last studies was observed; 5 patients developed them only on follow up studies. Segments 4b and 3 were most frequently involved (76% of the cases). Nodules were isointense in signal in relation to the rest of the liver in major sequences, however, were lower in signal intensity on T2 haste sequences (60.4%) and maintained the same signal characteristics on last study in 75% of cases. Lower signal compared to the rest of the parenchyma was seen in gadolinium studies on immediate phase sequences (76%), 1 to 2 min phase sequences (73%) and delayed phase sequences (76%). Gadoxetate disodium contrast enhanced studies were present in 3 patients revealing functioning hepatocytes within MRN. Spleen size increase between first and last study in MRN+ patients was 11.6mm (95% CI). Spleen size greater than 12cm and Ursodeoxycholic acid use showed correlation with MRN (p=0.024 and p=0.027 respectively).

CONCLUSION

MRN are distinguishable from other entities for its specific characteristics on MRI in PSC patients. T2 Haste and gadolinium phases sequences showed to be the best sequences for appreciation of the nodules. Their etiology and significance remain unknown, however appropriate acknowledgment is imperial for ruling out malignancy and essential for diagnosis. Further studies may elucidate their significance.

CLINICAL RELEVANCE/APPLICATION

Diagnosis improvement of patients with Primary Sclerosing Cholangitis

GI399-SD-TUB5 Impaired Glucose Tolerance: Relationship with Pancreatic Fibrosis Using T1 Mapping and Pancreatic Exocrine Function Estimated by Cine-Dynamic MRCP Using a Spatially Selective Inversion-Recovery Pulse

Station #5

Participants
Kazuya Yasokawa, Kurashiki, Japan (*Presenter*) Nothing to Disclose
Hiroki Nakamura, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Hidemitsu Sotozono, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Takeshi Fukunaga, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Akihiko Kanki, MD, Kurasiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Akira Yamamoto, MD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose
Tsutomu Tamada, MD,PhD, Kurashiki, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The effects of impaired glucose tolerance (IGT) on pancreatic fibrosis and pancreatic exocrine function (PEF) are not clear. This study aimed to evaluate the relationship between IGT and PEF, and IGT and pancreatic fibrosis, using glycosylated hemoglobin (HbA1c) and quantitative analysis with 3T MRI.

METHOD AND MATERIALS

This retrospective study received institutional review board approval. It included 193 patients with suspected hepatobiliary and pancreatic diseases who were undergoing 3T MRI, including cine-dynamic MRCP using a spatially selective inversion-recovery pulse (SSIR) and T1 mapping of the pancreatic parenchyma using a modified Look-Locker inversion recovery (MOLLI) sequence, and assessment of IGT with HbA1c. As an estimate of PEF, secretion grade (SG) based on the distance of pancreatic juice inflow in the main pancreatic duct on cine-dynamic MRCP was assessed. Patients were classified into four groups using modified American Diabetes Association criteria (non-diabetes, HbA1c < 5.7%; prediabetes, 5.7% <= HbA1c < 6.5%; type 2 diabetes mellitus (T2DM), 6.5 <= HbA1c < 8; and severe T2DM, HbA1c > 8).

RESULTS

A significant correlation was identified between pancreatic T1 value and HbA1c, and SG and HbA1c (r= 0.264, P< 0.0001 and r= -0.24, P= 0.001, respectively). Comparison of pancreatic T1 values among groups indicated a significant difference between all pairwise comparisons (P= 0.009 to < 0.001), excluding pairwise comparisons of non-diabetes and prediabetes (P< 0.05). The SG of non-diabetes was significantly higher than those of T2DM and severe T2DM (P= 0.032 and P= 0.001, respectively), although no significant difference was found in the comparison between a group and its immediately greater severity group (all P< 0.05).

CONCLUSION

IGT is associated with pancreatic fibrosis and PEF. Pancreatic fibrosis progresses gradually with increasing IGT. On the other hand, PEF tends to be maintained until advanced stages of IGT.

CLINICAL RELEVANCE/APPLICATION

Quantitative 3T MRI parameters obtained with T1 mapping and cine-dynamic MRCP using SSIR show potential for noninvasively elucidating the mechanism of IGT.

GI400-SD-TUB6 Can Single-Section, Machine Learning-Based Radiomics Differentiate Normal Liver from Diffuse Liver Diseases?

Station #6

Participants
Ruhani Doda Khera, MD, Cambridge, MA (*Presenter*) Nothing to Disclose

Fatemeh Homayounieh, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Ramandeep Singh, MBBS, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Felix Lades, Forchheim, Germany (*Abstract Co-Author*) Employee, Siemens AG
Andrew Primak, PhD, Cleveland, OH (*Abstract Co-Author*) Employee, Siemens AG
Subba R. Digumarthy, MD, Boston, MA (*Abstract Co-Author*) Speaker, Siemens AG; Research Grant, Lunit Inc; Researcher, Merck & Co, Inc; Researcher, Pfizer Inc; Researcher, Bristol-Myers Squibb Company; Researcher, Novartis AG; Researcher, F. Hoffmann-La Roche Ltd; Researcher, Polaris Pharmaceuticals, Inc; Researcher, Cascadia Healthcare, LLC; Researcher, AbbVie Inc; Researcher, Gradalis, Inc; Researcher, Clinical Bay; Researcher, Zai Lab
Mannudeep K. Kalra, MD, Lexington, MA (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, Riverain Technologies, LLC;

For information about this presentation, contact:

ruhanidoda@gmail.com

PURPOSE

We hypothesized that machine learning (ML)-based segmentation and radiomic features of liver from a single section of dual-energy CT can differentiate between normal, fatty and cirrhotic liver.

METHOD AND MATERIALS

Our IRB-approved study included 75 patients (mean age 54 ± 16 years; 44 females, 31 males) who underwent clinically-indicated, contrast-enhanced, portal venous phase, dual-energy abdomen-pelvis CT (SOMATOM Flash, Siemens). Low and high tube potential (80 and 140 kV) image datasets were de-identified and exported to a DECT segmentation and radiomic features analyses prototype (Radiomics, Siemens). The prototype enabled automatic segmentation of liver on a single CT section at the level of the porta hepatis. DECT iodine quantification and radiomics features were derived for the segmented portion of the liver in XML file format. The XML files were imported into a separate ML-based statistical analysis prototype (Radiomics, Siemens) for univariate and multivariate logistic regression and random forest classification.

RESULTS

Both iodine quantification (best AUC 0.95) and radiomic features (best AUC 0.95) differ significantly between normal, fatty and cirrhotic livers ($p<0.0001$). Normalized iodine concentration was superior than the iodine concentration and mean iodine uptake ($p<0.0004$) for differentiating the normal from fatty and cirrhotic liver. Amongst the radiomic features, the first order statistics demonstrated the highest accuracy (AUC 0.90-0.95, $P< 0.0001$). Machine learning based random forest classification yielded an AUC of 0.91 for differentiating normal from cirrhotic liver, 0.95 (AUC) for differentiating fatty and normal liver and 0.93 (AUC) for differentiating fatty and cirrhotic liver.

CONCLUSION

Single-section, DECT iodine quantification and radiomics features enable near-perfect differentiation (AUC up to 0.954) of normal, fatty, and cirrhotic liver from single-section analyses. The most accurate features were iodine concentration and first order statistics from radiomic analyses.

CLINICAL RELEVANCE/APPLICATION

Machine learning-enabled radiomics from single-section DECT can enable automatic distinction of normal liver from fatty and cirrhotic liver.

GI401-SD-TUB7 Feasibility of a Non-Invasive Short MRI Surveillance (SMS) Protocol as a Screening Tool for Hepatocellular Carcinoma (HCC) in High-Risk Patients

Station #7

Participants
Francois Willemssen, MD, Hoogstraten, Belgium (*Presenter*) Nothing to Disclose
Quido G. de Lussanet de la Sabloniere, MD,PhD, Rotterdam , Netherlands (*Abstract Co-Author*) Nothing to Disclose
Federico I. Fiduzi, BSC, Rotterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Christopher J. Els, Rotterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Gabriel P. Krestin, MD, PhD, Rotterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Roy S. Dwarkasing, MD, PhD, Rotterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

r.s.dwarkasing@erasmusmc.nl

PURPOSE

To investigate the feasibility of a non-invasive short MRI surveillance (SMS) protocol as an effective tool for detection of HCC in a high risk population

METHOD AND MATERIALS

From 2010 to 2019 patients were recruited who received yearly MRI liver for HCC screening in a surveillance program. These patients recieved more than two full MRI liver protocol. We hypothesized that SMS consisting of axial: T2W fat saturation, DWI (b=0 and 600, 800) and T1W in-and oppose phase, with an aquisition time of less that 10 minutes, could suffice for detection of HCC suspected lesions. MRI with HCC on first detection and the second to last MRI in HCC naive patients were included for evaluation. Imaging data consisting of SMS was anonymized and uploaded on a separate research server. Two radiologist with different levels of experience (reader 1: 12 years, tertiary center; reader 2: 4 years, general hospital) reviewed the imaging data seprately and blinded using a CRF in the online clinical software program 'openclinica'. Confidence scores on presence, size and type of lesions were attributed to a five-point scale per SMS sequence: 1) HCC, 2) probably HCC, 3) uncertain, 4) benign, 5) no lesions. Results were compared to the reference standard (full MRI liver protocol). Sensitivity, specificity of SMS were calculated with Excel and SPSS.

RESULTS

215 patients were included; 78 (83 %) with cirhosis and the remaining 37 patients with non-cirrhotic hepatitis. Thirty nine patients

(18.1 %) had true HCC. The intra-class correlation coefficient (ICC) was good (0.82). Reader 1 scored better (sens. 94 %, spec. 80 %, false neg. 6 %, false pos. 20 %) than reader 2 (89 %, 72 %, 11 %, 29 % respectively). When 'uncertain'lesions are also included as suspect for HCC then specificity increases for both readers, albeit with loss of sensitivity (reader 1: sens. 78 %, spec. 95 %, false neg. 22 %, false pso. 5 %; and reader 2: 72 %, 94 %, 28 %, 4 % respectively).

CONCLUSION

Our proposed short MRI surveillance (SMS) protocol yield high sensitivity and specificity both for the experienced and in-experienced observer for detection of lesions that can be regarded as suspect for HCC.

CLINICAL RELEVANCE/APPLICATION

Our SMS protocol can be considered as an effective screening tool for HCC and may potentially replace ultrasound (US) with better sensitivity and specificity for detection of early HCC than reports from the literature on screening with US.

GI402-SD-TUB8 Prediction of Disease-Free Survival in Colorectal Cancer Patients with Liver Metastasis Using Radiomics Features

Station #8

Participants
Myunghwan Lee, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Yong Eun Chung, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sungwon Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Kyunghwa Han, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Joonseok Lim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Myeong-Jin Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Research grant, Bayer Pharma AG; Honoraium, Guerbet SA, GE healthcare, Philips, and Siemens Healthineers

For information about this presentation, contact:

mhwan0901@yuhs.ac

PURPOSE

To evaluate whether radiomics features predict disease free survival (DFS) in colorectal cancer patients with liver metastasis and to compare diagnostic performance of radiomics parameters with clinical factors.

METHOD AND MATERIALS

In this retrospective study, a total of 161 colorectal cancer patients (mean age, 59.8 years old; male ratio, 112/161) with liver metastasis who underwent curative resection from January 2006 to October 2014 were included. Radiomic features (n = 469) were extracted from the largest area of the liver metastasis on preopertive portal venous phase CT image using pyradiomics. CT scans and clinico-pathologic factors were obtained. A radiomics score was made using penalized cox regression with a least absolute shrinkage and selection operator (LASSO Cox) to predict DFS. Diagnostic performance of radiomics score, clinical parameters only model, and combined model were built and comapred by the area under the receiver operating characteristic curve (AUC). The radiomics score and combined models were internally validated in primary cohort using bootstrap methods.

RESULTS

Tumor recurrence was found in 53% (85/161) of patients during the follow up period. The median DFS of patients was 848 days (Interquartile range {IQR}, 214-1880 days). Among 468 radiomics features, 15 features were selected in the LASSO Cox regression model. The radiomics score and combined models for DFS were successfully validated through internal validation. The AUC of clinical features, radiomics score and combined model were 0.653 (95% confidence interval: 0.540, 0.734), 0.694 (0.630, 0.758) and 0.746 (0.670, 0.822), respectively. The combined model improved DFS prediction when compared with models containing only clinical parameters. (AUC difference 0.094, p=0.003).

CONCLUSION

The combination of radiomics features based on CT images and clinical parameters can improved DFS prediction in colorectal cancer patients with liver metastasis.

CLINICAL RELEVANCE/APPLICATION

The addition of radiomics features to clinical parameters can provide a more accurate prediction of DFS in colorectal cancer patients with liver metastasis.

GI403-SD-TUB9 Non-Invasive Liver Iron Overload Measurements by MRI: Comparison of Two Validated Protocols

Station #9

Participants
Juan Calle Toro, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Dmitry Khrichenko, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Hansel J. Otero, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Christian A. Barrera, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Suraj D. Serai, PhD, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

calletoroj@email.chop.edu

PURPOSE

MRI is an approved method to measure liver iron concentration (LIC). Presence of iron accelerates T2 relaxation and T2* signal decay, thereby causing signal loss on T2 weighted spin echo and T2* weighted gradient echo images. In this study, we compared R2 (1/T2) relaxivity and its derived LIC values to R2* relaxivity and its derived LIC on patients referred for iron overload evaluations.

METHOD AND MATERIALS

We performed a retrospective study of patients scanned for liver iron overload evaluation. In studies which R2 and R2* measuring sequences had been acquired, were included for analysis. All liver scans were performed on a 1.5T scanner. R2* acquisitions were done by acquiring gradient echo multi-echo images collected at increasing echo time (TE). All echoes were acquired in a single acquisition. We used 8-12 echo times with the first TE set as short as technically possible, which in practice is as close to 1ms as possible. For R2, five separate series of spin echo images were acquired with a fixed repetition time (TR) and increasing TE values of 6ms, 9ms, 12ms, 15ms and 18ms (spaced at 3ms interval) for an acquisition time of approximately 10-15 mins. The spin-echo image acquisitions were acquired free-breathing without respiratory compensation techniques. R2 and R2* maps were generated using parametric MRI software (www.parametricMRI.com, Philadelphia, PA, USA). Three regions of interest (ROIs) were drawn per subject and per dataset. 1 mid-slice whole liver ROI and 2 liver parenchyma ROIs were chosen. This was done to examine variability in ROI selection by the user.

RESULTS

140 studies where included. Mean age = 13.9 ± 10.1 years. LIC ranged from 1 to 43 mg/g covering a broad range from close to normal levels to extremely high iron levels. Representative maps of 3 separate patients ranging from low, mid to high LIC is shown in Figure. A linear relation was observed between LIC generated using R2 and by R2* (y=0.95x; R2=0.71). A higher user depended ROI variability was observed in R2 measurements as compared to R2* measurements.

CONCLUSION

LIC as measured by R2 and R2* methods is statistically comparable, with no significant statistical difference between these methods for LIC<30 mg/g.

CLINICAL RELEVANCE/APPLICATION

Non-invasive MRI LIC measurement using R2* show a better inter-observer and intra-observer correlation, less motion artifacts and a strong correlation to LIC measured using R2.

GI303-ED-TUB10 A Diagnosis Difficult to Swallow: Dysphagia Revisited

Station #10

Participants
Pramod K. Gupta, MD, Plano, TX (*Presenter*) Nothing to Disclose
Gregg D. Rice, MD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose
Francisco Garcia-Morales, MD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Pramod.Gupta@va.gov

TEACHING POINTS

Dysphagia, also known as difficulty in swallowing, is a common clinical problem with increasing prevalence, specifically with aging population. Barium swallow is the imaging modality of choice for the investigation of dysphagia due to its ability to evaluate the esophageal anatomy and motility. The purpose of this scientific exhibit is: 1. To review the common and uncommon causes of oropharyngeal and esophageal dysphagia. 2. To illustrate and describe the salient imaging findings of these disorders on barium swallow.

TABLE OF CONTENTS/OUTLINE

The contents of this exhibit will be organized as follows with short discussions, illustrated examples and images: (1). Oropharyngeal and esophageal anatomy (2). Dysphagia cases which will be organized and presented in following manner: 1. Oropharyngeal disorders: A. Functional: Aspiration, Cricopharyngeal bar B. Structural: Zenker's diverticulum, Killian-Jamieson diverticulum, Esophageal web, Post operative edema 2. Esophageal disorders: A. Functional: Achalasia, Scleroderma, Diffuse esophageal spasm (corckscrew esophagus) B. Structural: Diverticula (traction and epiphrenic), Extrinsic compression (from aberrant right subclavian artery, lymphadenopathy, lung carcinoma), Infection (candidiasis), Benign strictures, Malignant strictures, Neoplasms (benign and malignant). 3. Short quiz.

GI304-ED-TUB11 Right Lower-Quadrant Ultrasound Techniques, Tricks, and Pitfalls for Tenderness to Palpation

Station #11

Participants
Jamie N. Holtz, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Hailey Choi, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Dorothy J. Shum, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Loretta M. Strachowski, MD, San Francisco, CA (*Abstract Co-Author*) Royalties, Reed Elsevier; Speaker, World Class CME

TEACHING POINTS

• Right lower quadrant ultrasound (RLQ U/S) is an important modality in the diagnosis of acute appendicitis, especially in children. • Specific ultrasound techniques maximize success in visualization and diagnosis of acute appendicitis. • Diagnostic criteria for acute appendicitis include visualization of a noncompressible appendix greater than 6-7 mm in diameter. Secondary signs of appendicitis, when present, can also lead to the diagnosis. • Common pitfalls and differential diagnoses should be considered when using RLQ U/S to evaluate for acute appendicitis.

TABLE OF CONTENTS/OUTLINE

Objectives Introduction Right lower quadrant ultrasound technique: (A) Overview of graded compression technique; (B) Importance of patient positioning; (C) Using anatomy to your advantage Imaging features and diagnostic criteria of acute appendicitis: (A) Appendix size cutoffs; (B) Secondary signs of appendicitis Common pitfalls in ultrasound imaging for suspected appendicitis: (A) Noncompressible, borderline enlarged appendix; (B) Imaging differential diagnosis (for example; mesenteric adenitis, appendiceal mucocele, diverticulitis, lymphoid hyperplasia, intussusception, appendiceal neoplasm, typhlitis) Summary

GI305-ED-TUB12 Dual Energy CT Applications in Pancreatic Pathologies

Station #12

Participants
Julia A. Miranda, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Natally Horvat, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Isabela D. Alves, MD, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Gabriela R. Camerin, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Adriano Basso Dias, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Publio C. Viana, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Giovanni G. Cerri, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

juazevedomiranda@gmail.com

TEACHING POINTS

? Understand the physical principles of Dual Energy CT (DE CT) ? Recognize post processing techniques of DE CT ? Comprehend advantages and limitations of DE CT compared to Single Energy CT ? Know applications in pancreatic pathologies ? Be familiar with future directions of DE CT in pancreatic pathologies.

TABLE OF CONTENTS/OUTLINE

? INTRODUCTION - Importance of DE CT and pancreatic pathologies for diagnostic imaging ? PHYSICAL PRINCIPLES - Physical principles of DE CT and how to perform ? POST PROCESSING - Explanation of how post-processing techniques enables creation of virtual non-contrast and virtual monoenergetic images, as well as the assessment of enhancement through iodine maps. ? CLINICAL APPLICATIONS - Cases of different pancreatic pathologies to illustrate and solidify the concepts ? FUTURE DIRECTIONS - What's in the horizon for DE CT in pancreatic pathologies

GI301-ED-TUB13 Achalasia: A Primer for Radiologists

Station #13

Participants
Nour Nakrour, MD , Shreveport, LA (*Abstract Co-Author*) Nothing to Disclose
Alberto I. Carbo, MD, Shreveport, LA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

acarbo@lsuhsc.edu

TEACHING POINTS

The purposes of this educational exhibit are to: • Describe the anatomy and physiology of the esophagogastric junction (EGJ) • Discuss the physiopathology of achalasia • Explain the fluoroscopic technique • Discuss the diagnosis and differential diagnosis of achalasia • Describe the associated swallowing disorders and complications • Explain the radiologic evaluation after treatment

TABLE OF CONTENTS/OUTLINE

• Definition. Frequency. Symptoms • Anatomy of the EGJ • Physiology of the lower esophageal sphincter (LES) • Pathophysiology of achalasia • Radiologic technique • Diagnosis and differential diagnosis of achalasia on plain films and CTs • Diagnosis of achalasia on esophagogram: stricture evaluation (location, shape, mucosal surface, pliability), associated esophageal dysmotilities, megaesophagus, estimation of severity • Differential diagnosis with secondary achalasias: gastric, cardial and esophageal tumors, gastroesophageal reflux disease, extrinsic compressions, Schatzky ring, Chagas disease, failed fundoplication • Differential diagnosis with other esophageal motility disorders: vigorous achalasia, hypertonic LES and scleroderma • Detection of complications: aspiration pneumonia, candidiasis, esophageal tumors • Associated swallowing abnormalities • Radiologic evaluation after treatment: dilatation, Heller myotomy, gastric fundoplication

GI302-ED-TUB14 The New 2017 World Health Organization (WHO) Classification of Pancreatic Neuroendocrine Tumors: A Primer for Radiologists

Station #14

Awards
Certificate of Merit
Identified for RadioGraphics

Participants
Lokesh Khanna, MD, San Antonio, TX (*Presenter*) Nothing to Disclose
Matthew Milam, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Sainath Kondapaneni, San Antonio,, TX (*Abstract Co-Author*) Nothing to Disclose
Anil K. Dasyam, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Varaha Tammisetti, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Alia Nazarullah, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Umber Salman, MD, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Abhijit Sunnapwar, MD, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Srinivasa R. Prasad, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Venkata S. Katabathina, MD, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

katabathina@uthscsa.edu

TEACHING POINTS

1. Familiarize the audience with updates of 2017 WHO Classification Pancreatic Neuroendocrine Tumors (PanNETs) 2. Describe pathology, genetics & select genetic syndromes associated with PanNETs 3. Anatomic & Functional Imaging of Pan NETs 4. Review current & evolving treatment options for PanNETs & role of multimodality imaging techniques in management

TABLE OF CONTENTS/OUTLINE

• Introduction • The 2017 WHO classification (well-differentiated vs. poorly differentiated NETs) • Genetic Mutations: MEN1 & ATRX/DAXX • Genetic Syndromes with PanNETs: MEN1, VHL, Tuberous Sclerosis & Glucagon Cell Hyperplasia & Neoplasia • Types of PanNETs (Insulinoma, Glucagonoma, Somatostatinoma, VIPoma, Gastrinoma, Serotonin-producing, ACTH producing & Non-Functioning) and their unique imaging, genetic, molecular, pathologic & clinical findings • Pancreatic Neuroendocrine Carcinoma: Genetics & Imaging • Mixed NE/ductal & NE/acinar carcinoma • Anatomic Imaging: US, CT & MRI Radiogenomics (ATRX/DAXX mutations) • Functional Imaging: PET with different tracers, including Dotatate • Management • Novel Targeted Therapeutics • Natural History & prognosis • Conclusion The new 2017 WHO classification of PanNETs has provided strong diagnostic & prognostic tools to better assess clinical outcomes & therapeutic strategies. Imaging plays a pivotal role in diagnosis & appropriate patient management.

GI306-ED-TUB15 Clinical Impact of State-of-the-Art CT Technology in Abdominal CT: Ultra-High Resolution CT (UHRCT) and Low-Voltage CT

Station #15

Participants
Haruomi Yamaguchi, MD, Hidaka, Japan (*Presenter*) Nothing to Disclose
Eriko Maeda, MD, Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomoaki Ichikawa, MD, PhD, Hidaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroyuki Morisaka, MD, Hidaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Katsuhiro Sano, MD,PhD, Hidaka, Japan (*Abstract Co-Author*) Nothing to Disclose
So Tsushima, Otawara, Japan (*Abstract Co-Author*) Employee, Canon Medical Systems Corporation
Kenji Ino, PhD, Bunkyo-Ku, Japan (*Abstract Co-Author*) Nothing to Disclose
Jiro Sato, MD, Bunkyo, Japan (*Abstract Co-Author*) Nothing to Disclose
Osamu Abe, MD, PhD, Itabashi-ku, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yamaguchi.haruomi@gmail.com

TEACHING POINTS

A It is important to learn the principle and clinical applications in the abdomen of the new CT technologies. B.UHRCT (acquisition in combination with 1024x1024 matrix and 0.25-mm section thickness) has a great impact on visualizing fine abdominal arteries (e.g., cystic artery, pancreatic-arcade arteries, or branches of segmental arteries) which are important to decide therapeutic strategies (e.g., laparoscopic cholecystectomy, pancreatoduodenal surgery, or liver transplant) especially on three-dimensional, volume rendering (3D-VR) images. C. Low-voltage CT improves to visualizing fine abdominal vessels on 3D-VR images in combination with UHRCT. D. Low-voltage CT also improves the detectability of small hypervascular (e.g., hepatocellular carcinoma or pancreatic neuroendocrine tumors), or hypovascular (e.g., pancreatic carcinoma) neoplasms on multiphasic contrast-enhanced CT. E. UHRCT is useful to improve the diagnostic accuracy of local extension of pancreatic carcinoma to peripancreatic neural plexus.

TABLE OF CONTENTS/OUTLINE

A The principle of UHRCT B. The basic performance of UHRCT C. The clinical usefulness of UHRCT for the pre-operative plan of the liver transplantation D. The visualization of a cystic artery with 3D-VR images with UHRCT compared to conventional CT E. the visualization of normal pancreatic external nerve plexus

MSCC33

Case-based Review of Nuclear Medicine: PET/CT Workshop-Abdomen/Pelvis & Pediatrics (In Conjunction with SNMMI) (Interactive Session)

Tuesday, Dec. 3 1:30PM - 3:00PM Room: E450B

CT GI GU NM PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Medhat M. Osman, MD, Saint Louis, MO (*Moderator*) Speakers Bureau, Advanced Accelerator Applications SA

Sub-Events

MSCC33A Adult Abdomen/Pelvis

Participants
Don C. Yoo, MD, Lexington, MA (*Presenter*) Consultant, inviCRO, LLC
Terence Z. Wong, MD, PhD, Chapel Hill, NC (*Presenter*) Consultant, Lucerno Dynamics, LLC;

For information about this presentation, contact:

donyoo@brown.edu

LEARNING OBJECTIVES

1) Review challenging and instructive cases PET/CT scans in the abdomen and pelvis which will help with interpretation of PET/CT scans.

ABSTRACT

For oncologic studies, F18-FDG is an outstanding tracer with wide applications. However, there are many pitfalls which can make interpretation challenging. The purpose of this educational activity is to familiarize the audience with the normal biodistribution of FDG in the body and learn various pitfalls in the abdomen and pelvis that can occur when interpreting oncologic PET/CT scans.

MSCC33B Pediatrics

Participants
Helen R. Nadel, MD, Palo Alto, CA (*Presenter*) Consultant, ICON plc

For information about this presentation, contact:

hnadel@stanford.edu

LEARNING OBJECTIVES

1) Be able to identify indications for pediatric PET /CT or PET/MRI imaging. 2) Be familiar with protocols used for pediatric PET/MRI.

MSRO33

BOOST: Gastrointestinal

Tuesday, Dec. 3 1:30PM - 2:30PM Room: S103AB

GI RO

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 0

Participants

Navesh K. Sharma, PhD,DO, Hershey, PA (*Presenter*) Consultant, Sirtex Medical Ltd; Speaker, Sirtex Medical Ltd

Printed on: 10/29/20

RC413

Pediatric Series: Gastrointestinal/Genitourinary

Tuesday, Dec. 3 3:00PM - 6:00PM Room: E353B

GI GU PD

AMA PRA Category 1 Credits ™: 2.75
ARRT Category A+ Credits: 3.25

FDA Discussions may include off-label uses.

Participants
Jonathan R. Dillman, MD, MSc, Cincinnati, OH (*Moderator*) Research Grant, Siemens AG; Research Grant, Guerbet SA; Travel support, Koninklijke Philips NV; Research Grant, Canon Medical Systems Corporation; Research Grant, Bracco Group
Ethan A. Smith, MD, Cincinnati, OH (*Moderator*) Nothing to Disclose
Brandon P. Brown, MD, Indianapolis, IN (*Moderator*) Nothing to Disclose
Sabah Servaes, MD, Philadelphia, PA (*Moderator*) Nothing to Disclose

Sub-Events

RC413-01 Pediatric Liver Malignancies

Tuesday, Dec. 3 3:00PM - 3:20PM Room: E353B

Participants
Gary R. Schooler, MD, Dallas, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Identify clinical and imaging characteristics of the two most common primary pediatric hepatic malignancies: hepatoblastoma and hepatocellular carcinoma. 2) Apply an up-to-date imaging strategy for pediatric patients with hepatoblastoma and hepatocellular carcinoma.

RC413-02 Diagnosis of Pediatric Liver Diseases with Multiparametric MRI and Quantitative Magnetic Resonance Cholangiopancreatography (MRCP) Analysis

Tuesday, Dec. 3 3:20PM - 3:30PM Room: E353B

Participants
Lin Cheng, Oxford, United Kingdom (*Presenter*) Employee, Perspectum Diagnostics Ltd
Sofia Mouchti, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd
Ged Ridgway, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd; Stockholder, Perspectum Diagnostics Ltd
Marc H. Goldfinger, Msc, PhD, Oxford, United Kingdom (*Abstract Co-Author*) Researcher, Perspectum Diagnostics Ltd
Carlos D. Ferreira, Oxford, United Kingdom (*Abstract Co-Author*) Shareholder, Perspectum Diagnostics Ltd; Employee, Perspectum Diagnostics Ltd
Andrea Borghetto, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd
Andrea Dennis, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd
Matt Kelly, PhD, Oxford, United Kingdom (*Abstract Co-Author*) Employee, Perspectum Diagnostics Ltd
Kamil Janowski, Warsaw, Poland (*Abstract Co-Author*) Nothing to Disclose
Elzbieta Jurkiewicz, MD, Warsaw, Poland (*Abstract Co-Author*) Nothing to Disclose
MacIej Pronicki, Warsaw, Poland (*Abstract Co-Author*) Nothing to Disclose
Ma?Gorzata Wozniak, Warsaw , Poland (*Abstract Co-Author*) Nothing to Disclose
Sylwia Chelstowska, Warsaw, Poland (*Abstract Co-Author*) Nothing to Disclose
Wieslawa Grajkowska, Warsaw, Poland (*Abstract Co-Author*) Nothing to Disclose
Stefan Neubauer, Oxford, United Kingdom (*Abstract Co-Author*) Shareholder, Perspectum Diagnostics Ltd Non-Executive Director, Perspectum Diagnostics Ltd
David Debrota, MD, Zionsville , IN (*Abstract Co-Author*) Vice President, Perspectum Diagnostics Ltd
Michael Brady, Oxford, United Kingdom (*Abstract Co-Author*) Founder and Chairman, Perspectum Diagnostics Ltd Founder and Chairman, Volpara Health Technologies Limited Founder, ScreenPoint Medical BV Chairman, Acuitas Medical Ltd Chairman, IRISS Medical Chairman, Colwiz
Rajarshi Banerjee, MD,DPhil, Oxford, United Kingdom (*Abstract Co-Author*) CEO, Perspectum Diagnostics Ltd
Piotr Socha, Warsaw, Poland (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

lin.cheng@perspectum.com

PURPOSE

Non-invasive objective diagnostic methods are urgently needed in paediatric liver diseases, such as autoimmune hepatitis (AIH) and primary sclerosing cholangitis (PSC). Iron-corrected T1 (cT1) generated from a multiparametric MRI method *LiverMultiScan*TM (LMS) has been shown to correlate with biopsy-assessed inflammation and fibrosis in adults [1]. The biliary tree can be analysed by a novel quantitative MRCP method, *MRCP+*, quantifying biliary tree volume, local duct diameters, and dilated/strictured regions. Here, we investigate whether biomarkers from LMS and MRCP+ can differentiate AIH, PSC and healthy controls in the paediatric setting.

METHOD AND MATERIALS

In this prospective study, 49 paediatric patients (6-18 yrs.; AIH: n=41; PSC/AIH overlap syndrome: n=8) and 20 healthy age-matched controls underwent LMS and T2w MRCP imaging on 1.5T Siemens Avanto-fit. cT1(median, interquartile range), T2*, fat fraction, etc. were generated from LMS, and 20 biliary system metrics were generated from MRCP+; in total 25 variables were fit to logistic regression models to discriminate healthy, AIH and PSC patients. Stepwise logistic regression was used to select optimal combinations of variables to stratify individuals by disease. ROC analysis was performed for the selected predictors and their combinations.

RESULTS

Median cT1 and the sum of dilation severity are the optimal predictors for classifying healthy from disease group (p=0.015 and 0.013, respectively), and their combination yields the strongest predictor (AUC=0.86). Four individual predictors: fat fraction, median cT1, number of ducts with candidate strictures, and length percentage of strictured or dilated ducts, can significantly differentiate AIH from non-AIH (p=0.038, 0.003, 0.024 and 0.023, respectively); ROC curves indicate that their combination is the strongest predictor for AIH (AUC=0.83). The number of ducts with candidate strictures is the strongest predictor for discriminating PSC (p=0.003) and yields AUC of 0.85, which shows MRCP+ has the potential to objectively differentiate PSC from non-PSC.

CONCLUSION

LiverMultiScan and quantitative MRCP have the potential to aid radiologists with the assessment of paediatric liver diseases including AIH and PSC.

CLINICAL RELEVANCE/APPLICATION

A novel non-invasive method using multiparametric MRI and quantitative MRCP (*MRCP+*) can predict healthy/AIH/PSC objectively, thus aid clinicians with the diagnosis of paediatric liver diseases.

RC413-03 Assessment of Normal Values of GSI Spectroscopy in Children's Liver Based on Fixed-time Contrast Medium Injection

Tuesday, Dec. 3 3:30PM - 3:40PM Room: E353B

Participants
Chunxiang Wang, Tianjin, China (*Presenter*) Nothing to Disclose
Nan Yang, Tianjin , China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Objective: Spectral CT can provide meaningful multi-parameter diagnostic information for clinic. However, the normal values of liver energy spectrum analysis in children are still unclear. In this study, the normal range of liver energy spectrum analysis in children with enhanced GSI was assessed by fixed-time injection of iodine contrast agent based on their body weight.

METHOD AND MATERIALS

MATERIALS: Thirty children with body mass greater than 20 kg and non-hepatic lesions underwent abdominal CT enhancement from January to February 2019 were selected. All children underwent abdominal CT enhancement using the Revolution GSI model. All patients were given iodine contrast medium of 300 mg I/ml at 1.5 ml/kg and fixed contrast medium injection time of 24 seconds. (Table 1)Portal vein phase was selected for evaluation, and the delay time was fixed at 56 seconds after injection. The values of 70 KeV, iodine water value(mg/ml), water iodine value(mg/ml)and Effective-Z atomic number of 8 segments of liver were measured by Couinaud liver segmentation method(Fig.1). All data were tested by single sample T test, and the 70 KeV, iodine water value, iodine water value, Effective-Z atomic sequence value and body weight of each segment were displayed by scatter plot.

RESULTS

Results: The body weight of 30 samples ranged from 20.1 kg to 65.0 kg, with an average of 29.60 + 12.26 kg. Single sample T test showed no significant changes in liver energy spectrum 70 keV, iodine water value, water iodine value and Effective-Z atomic number of children with different body weight (Table 2). The scatter plot showed that the 70 keV value of each liver segment increased with the increase of body weight, while the trend lines of iodine water value, water iodine value and atomic sequence value showed a steady trend(Fig.2).

CONCLUSION

CONCLUSION: The normal CT value of children's liver parenchyma obtained by traditional enhanced examination is not reliable, but the normal values of iodine water, water iodine and Effective-Z atomic number of children's liver obtained by fixed time injection of iodine contrast agent can be trusted.

CLINICAL RELEVANCE/APPLICATION

CLINICAL RELEVANCE/APPLICATION:The determination of normal values of multi-parameters of children's liver energy spectrum CT can reflect the characteristics and functional status of children's liver more comprehensively, so as to obtain more accurate and comprehensive diagnosis.

RC413-04 CT and MR Imaging of Pancreatic Trauma in Children

Tuesday, Dec. 3 3:40PM - 3:50PM Room: E353B

Participants
Ala Y. Ibrahim, Toronto, ON (*Presenter*) Nothing to Disclose
Paul Wales, MD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Michael R. Aquino, MD, MS, Toronto, ON (*Abstract Co-Author*) Co-author, Reed Elsevier
Govind B. Chavhan, MD, Toronto, ON (*Abstract Co-Author*) Speaker, Bayer AG

For information about this presentation, contact:

dr.alaa_yonis@yahoo.com

PURPOSE

To evaluate the type and grade of pancreatic injury in children on CT and correlate it with management and outcome. To evaluate MRI findings of pancreatic trauma and correlate it with CT grades of pancreatic injury.

METHOD AND MATERIALS

Retrospective review of children with pancreatic injury over 16 years period was performed to note mechanism of injury, injury severity score(ISS), associated abdominal injuries, management and interventions performed, and outcome. All CT and MR images were re-reviewed by two radiologists and pancreatic injuries were classified according to the American Association for the Surgery of Trauma (AAST)

RESULTS

Of 3,265 children presented with trauma during the study period, only 28 (0.86%) children (M:F 19:9; mean age 7.14 yrs; age range1-15yrs) had pancreatic injury. 27 had CT of the abdomen with 26 of them performed on the day of trauma. According to AAST, there were 5 (19%) grade I, 9 (33%) grade II, 8 (30%) grade III, and 3 (11%) grade IV. No pancreatic parenchymal injury was identified in 2 (7%) patients with isolated fluid around the pancreas and mesentery. Associated injuries were seen in 93% cases. MRI was performed in 10 children on day 0-330 (median 41 day) of trauma. Pancreatic duct injury was seen on 5/10 and pseudocyst on 4/10. Signal intensity difference in pancreatic parenchyma (SIDPP) and caliber difference in duct (CDD) proximal and distal to the injury site was seen in 5/10 children, 2/10 showed only SIDPP, 1/10 showed only CDD and 1/10 showed atrophy of body and tail with ductal dilatation. Two patients died because of multiorgan injuries, 9 patients (mainly with grade III and IV injuries)underwent surgery and/or ERCP and 16 patients (mostly grade I&II)were treated conservatively. AAST grading of pancreatic injury on CT correlated with type of management (p=0.0001).

CONCLUSION

CT grading of injury correlates with management and guides intervention and/or surgery versus conservative treatment. MRI is useful for assessing ductal injury and secondary changes in pancreatic parenchyma and the PD, and it should be performed when the status of the PD is not clear on CT

CLINICAL RELEVANCE/APPLICATION

CT grading of pediatric pancreatic injury is crucial as it correlates with subsequent management. MRI is useful for assessing ductal injury and secondary changes in pancreatic parenchyma.

RC413-05 DTI of the Kidney in Children: Comparison between Normal Kidneys and Those with Ureteropelvic Junction (UPJ) Obstruction

Tuesday, Dec. 3 3:50PM - 4:00PM Room: E353B

Participants
Suraj D. Serai, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Juan Calle Toro, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
J. C. Edgar, PhD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Hansel J. Otero, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

calletoroj@email.chop.edu

PURPOSE

To compare renal diffusion tensor imaging (DTI) parameters in patients with or without ureteropelvic junction (UPJ) obstruction.

METHOD AND MATERIALS

Patients that underwent functional MR urography (MRU) with renal DTI were retrospectively selected. Kidneys deemed normal on T2-weighted images and functional parameters (i.e. time to peak, calyceal transit time and renal transit time) were used as control kidneyss and compared to kidneys with morphologic findings of UPJ obstruction and renal transit time >490 seconds. DTI included a 20-direction DTI with b-values of b=0 s/mm2 and b=400 s/mm2. Diffusion Toolkit and TrackVis were used for analysis and segmentation. TrackVis was used to draw regions of interest (ROI) covering the entire volume of the renal parenchyma, excluding the collecting system. Fibers were reconstructed using a deterministic fiber tracking algorithm. Whole kidney ROI based analysis was performed to obtain cortico-medullary measurements (Fractional anisotropy (FA), ADC and track length) for each kidney. T-tests compared means with statistical significance defined at $p<0.05$.

RESULTS

118 normal kidneys from 102 patients (mean age 8.0 ± 5.8 years; 58 males and 44 females) were compared to 18 kidneys from 16 patients (10.4 ± 6.8 years; 9 males and 7 females) with UPJ Obstruction. Mean FA values were significantly lower (0.31 ± 0.07; n=18) in kidneys with UPJ obstruction than normal kidneys (0.40 ± 0.08; n=118) ($p<0.001$). ADC was marginally significantly different ($p= 0.01$) and track length was not significantly different ($p= 0.24$).

CONCLUSION

DTI derived fractional anisotropy (FA) appears to discriminate between normal kidneys and those with UPJ obstruction, in the future, FA could potentially be used to monitor renal damage in patients with UPJ obstruction obviating the need for contrast administration and thus shortening exam length.

CLINICAL RELEVANCE/APPLICATION

DTI of the kidney is feasible in a clinical setting and can provide complementary functional information in patients with UPJ obstruction.

RC413-06 Imaging Features and Clinical Decision-making in Pediatric Focal Nodular Hyperplasia

Tuesday, Dec. 3 4:00PM - 4:10PM Room: E353B

Participants
Greg Chambers, MBBS, MSc, Paris, France (*Presenter*) Nothing to Disclose
Angelo Zarfati, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Cecile Cellier, Rouen, France (*Abstract Co-Author*) Nothing to Disclose
Catherine Adamsbaum, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Sophie Branchereau, Paris, France (*Abstract Co-Author*) Nothing to Disclose
Stephanie Franchi-Abella, MD, Le Kremlin-Bicetre, France (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

g.chambers@nhs.net

PURPOSE

Describe imaging features of pediatric focal nodular hyperplasia (pFNH) in a large cohort and propose clinical, radiological and surgical management

METHOD AND MATERIALS

Imaging of 87 children with 105 pFNH lesions from 1977-2018 were evaluated by 2 radiologists for features such as size, number, echogenicity/density/intensity, presence of central scar and enhancement pattern. All patients referred from 1996 were assessed for symptoms, risk factors, initial management, follow up and outcome. Results were used to form management guidelines for future patients.

RESULTS

87 patients (70% female) with 105 lesions were analysed. 8 patients (9.2%) had multiple pFNH. Size ranged from 1-13.7cm. Ultrasound (US) imaging was available for 82 patients, CT in 32 patients and MRI in 44 patients. pFNH are iso-/hyperechoic on US (68/82) with arterial Doppler flow in 75% (36/48). Contrast US shows typical enhancement in 86% (6/7). On CT, pFNH are iso-/hypodense (30/32) pre-contrast with typical enhancement in 79.5% (31/39). On MRI, pFNH are iso-/hypointense on T1 (37/44), iso-/hyperintense on T2 (42/44), hyperintense on diffusion (23/28) and show typical enhancement in 71.8% (28/39). 50 patients were referred after 1996: 74% females, mean age 8.9 years old with 46% symptomatic. Mean length of follow-up was 5.2 years. Mean long axis diameter pFNH lesion at diagnosis was 5.9cm. 74% of patients underwent watchful waiting and 26% surgical resection. Of the watchful waiting patients 25 (67.5%) had lesional growth, 6 (16.2%) showed stability and 6 (16.2%) showed lesional decrease. 9 (24.3%) of the observed patients eventually had surgery. 92% of patients were asymptomatic at the end of follow-up with no significant difference in the surgical and observational groups.

CONCLUSION

pFNH is a rare tumour which can be large, multiple, atypical on imaging and a weaker predisposition for females than in adults. Atypical cases require histological confirmation to exclude differential diagnoses such as adenoma. We propose a conservative approach to treatment given that surgery has risks and complications. Surgery should be considered first line in patients presenting with compressive abdominal symptoms.

CLINICAL RELEVANCE/APPLICATION

These results offer a clinico-radiological strategy for the diagnosis and management of these rare pediatric liver tumours, which will help clinicians triage their patients towards wathcful wating, radiological intervention or surgery.

RC413-07 CEUS of Pediatric Liver Masses

Tuesday, Dec. 3 4:10PM - 4:30PM Room: E353B

Participants
Judy H. Squires, MD, Pittsburgh, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

judy.squires@chp.edu

LEARNING OBJECTIVES

1) Learn basic principles for performing contrast-enhanced ultrasounds for focal liver lesion evaluation. 2) Identify imaging characteristics of common focal liver lesions, including how to distinguish benign from malignant lesions.

RC413-08 Imaging of Pediatric Pancreatitis

Tuesday, Dec. 3 4:40PM - 5:00PM Room: E353B

Participants
Sudha A. Anupindi, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

anupindi@email.chop.edu

LEARNING OBJECTIVES

1) Define the current terminology of subtypes of pancreatitis in children. 2) Describe the current and emerging imaging techniques for pediatric pancreatitis. 3) Examine the common congenital anomalies which lead topancreatitis.

RC413-09 Imaging Diagnosis and Differential Diagnosis of Pancreatoblastoma (PB) and Solid Pseudopapillary Tumors (SPTs) of Children

Tuesday, Dec. 3 5:00PM - 5:10PM Room: E353B

Participants
Zhaoxia Yang, Shanghai , China (*Presenter*) Nothing to Disclose
Ying Gong, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Zhongwei Qiao, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

879760449@qq.com

PURPOSE

To determine if characteristic features on computed tomographic and (or) magnetic resonance imaging can differentiate pancreatoblastoma(PB) and solid pseudopapillary tumours (SPTs) of the pancreas in children.

METHOD AND MATERIALS

The clinical and imaging data of 34 children with pancreatoblastoma(PB) and solid pseudopapillary tumours (SPTs) that were confirmed by surgeries were retrospectively analyzed,including 20 cases of SPTs and 14 cases of PB. The size, margin, calcification, hemorrhage, proportion of solid component, intratumoral vessels, encapsulation of the tumor, dilatation of pancreatic duct, peripancreatic vessel invasion, distance metastasis status, and the apparent diffusion coefficient(ADC) values of the two groups were analyzed and key diagnostic points were identified. Statistical analysis was performed using the $\chi 2$ test and the Student's t test.

RESULTS

All children with SPTs were more than 5 years old which was significant older than children with PB(p=0.000);There was no significant sex differential between SPTs and PB(p=0.148). Mean maxisimum tumour size in PB was signifcantly larger than SPTs (p=0.001). PB presented with more calcification(p=0.002), intratumoral vessels(p=0.000), vascular invasion(p=0.000) and distant metastasis(p=0.003) comparison with SPTs, while SPTs were more prone to hemorrhage(p=0.033) and had a higher mean ADC value(p=0.019). There were no significant statistical differentiation in tumor capsule(p=0.442), dilatation of pancreatic duct(p=1.000), and cystic degeneration area over than 50% of tumor volume(p=0.719) between two groups of tumors.

CONCLUSION

CT and (or) MRI is helpful in the differential diagnosis of pancreatoblastoma(PB) and solid pseudopapillary tumors (SPTs) of pancreas in children.Pancreatoblastomas were usually presented as large tumors with calcification,intratumoral vessel,vascular invasion and distant metastasis comparison with SPTs,while SPTs had a tendency to intratumoral hemorrhage and higher ADC values.

CLINICAL RELEVANCE/APPLICATION

SPT is the most common pancreatic tumor in children; And pancreatoblastoma(PB) is considered the most common malignant tumor in children in the first decade. Differential diagnosis of these two tumors is very important for clinical because of different prognosis. Our result demonstrated that CT and (or) MRI is helpful in the differential diagnosis of PB and SPTs of the pancreas in children.

RC413-10 Study on Normal Range of GSI Energy Spectrum Analysis of Children's Pancreas Based on Contrast Agent Fixed-Time Injection Method

Tuesday, Dec. 3 5:10PM - 5:20PM Room: E353B

Participants
Sipei Xing, Tianjin , China (*Presenter*) Nothing to Disclose
Nan Yang, Tianjin , China (*Abstract Co-Author*) Nothing to Disclose
Chunxiang Wang, Tianjin, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

xingsipei14@163.com

PURPOSE

This study used a fixed-time injection of iodine contrast agent based on the body mass of the child to evaluate the normal range of the analysis of the pancreatic energy spectrum of the children in the GSI spectrum enhancement examination.

METHOD AND MATERIALS

Thirty children with a body mass greater than 20 kg and a non-pancreatic lesion with abdominal CT enhancement were selected from 2019.1 to 2019.2. All patients underwent GSI spectroscopy CT enhancement examination using GE revolution CT. Four scan protocols (four groups) were scanned according to body weight (Table 1), and a uniform contrast protocol was used: 300 mgI was given according to the weight of the child per ml Iodine contrast agent 1.5ml/kg, and use 24s fixed contrast injection time method. All patients underwent an image evaluation of the portal vein phase. The phase delay time was 56s after the contrast agent injection. The ROI of the head, body and tail of the pancreas was selected (Fig. 1), and the four energy spectrum analysis values of 70KeV, iodine water value, water iodine value and atomic number were measured. The single sample statistics were drawn using SPSS software. (Table 2).

RESULTS

This indicates that the four energy spectrum analysis values of 70KeV, iodine water value, water iodine value and atomic number obtained are relatively fixed in children with pancreatic energy spectrum GSI enhanced CT examination using fixed-time injection of iodine contrast agent.

CONCLUSION

Contrast fixed injection time method according to different body weight to give different doses of iodine contrast agent, can ensure that children of different body weight under the contrast agent program and relatively fixed weight of iodine contrast agent, iodine contrast agent dose absorbed by human tissue Not affected by weight. Under the scanning scheme and the contrast agent scheme, the iodine dose is relatively constant, and is not affected by body weight, and the energy spectrum analysis value is relatively fixed, and the result has credibility under the scheme.

CLINICAL RELEVANCE/APPLICATION

Therefore, under this method, the energy spectrum analysis value can be used as a reference value for the normal energy spectrum analysis of the GSI enhanced CT examination of the pancreatic energy spectrum for the clinician to perform functional and component diagnosis based on the numerical value.

RC413-11 Quantified Terminal Ileal Motility during MR Enterography as a Biomarker of Crohn's Disease Activity in a Pediatric Population: A Retrospective Study

Tuesday, Dec. 3 5:20PM - 5:30PM Room: E353B

Participants
Alex Menys, London, United Kingdom (*Presenter*) Director, Motilent Ltd; Shareholder, Motilent Ltd
Lucia Cococcioni, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Shankar Kumar, BSC,MBBS, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Stuart A. Taylor, MBBS, Great Missenden, United Kingdom (*Abstract Co-Author*) Research Consultant, Robarts Clinical Trials, Inc; Shareholder, Motilent
Fevronia Kiparissi, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Tom A. Watson, MBChB, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

alex.menys.09@ucl.ac.uk

PURPOSE

A relationship between small bowel motility and inflammatory activity in Crohn's Disease is now well described in adults against endoscopic and histopathological measures of activity. This retrospective study explores this relationship between terminal ileal (TI) motility in children against a symptomatic endpoint.

METHOD AND MATERIALS

A review of a pediatric hospitals imaging database was performed to identify subjects with good quality MRE studies and a clinical appointment ±1mo to determine a clinical score for disease activity (PGA, a 4 point score 1 = no disease to 4 = severe). 68 subjects were identified (mean age 13.2, range 6 to 19) with dynamic 'cine' imaging through the terminal ileum. The dynamic imaging was processed, blind to any clinical data, with a previously validated motility assessment algorithm (GIQuant®, Motilent, London, UK). A consultant radiologist delineated the TI on each subject within 5cm of the ileocecal valve and the motility score derived. The TI was used as an repeatably identifiable reference to enable comparison between subjects. The TI motility score was correlated against the symptom score and the cohort split into clinically active disease PGA >1 and non-active = 1. The mean difference between groups was assessed with U-Test.

RESULTS

The median TI motility was 0.2 (range 0 to 0.6) and the median PGA symptom score was 1 (range 1 to 4). The correlation between the two measures was R = -0.32, P = 0.011. The mean motility score of those with active disease was 0.18 , compared to 0.26 for those without active disease, a statistically significant difference of 0.08, P = 0.003.

CONCLUSION

Subjects with reduced terminal ileal motility appeared to have a higher symptom load. These findings broadly support results in adult populations and comparison with an endoscopic or histopathological endpoint at the TI represents an important next step.

CLINICAL RELEVANCE/APPLICATION

MRI is non-invasive, safe and widely available option for monitoring Crohn's Disease activity making it an ideal test for subjects destined to undergo scanning for the rest of their lives. Biological therapy is now widely used in children to control inflammation. These drugs are very expensive. A rapid and objective biomarker of disease response like motility, espeically one that does not require gadolinium, is imporant to driving efficient spending in IBD.

RC413-12 Contrast-Enhanced Ultrasound in Pediatric Crohn's Patients: Comparative Study with MRI

Tuesday, Dec. 3 5:30PM - 5:40PM Room: E353B

Participants
Jesse K. Sandberg, MD, Palo Alto, CA (*Presenter*) Nothing to Disclose
Kiran Mudambi, MD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Dorsey Bass, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Erika Rubesova, MD, MSc, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jsandber@stanford.edu

PURPOSE

Current standard of practice for evaluating bowel inflammation in Crohn's disease (CD) includes magnetic resonance imaging (MRI). Despite MRI having a high sensitivity/specificity for detecting bowel wall inflammation; it requires oral contrast, long scan times, high costs and sedation in younger patients. Alternatively, contrast enhanced ultrasound (CEUS) provides quick evaluation of bowel at bedside without the need for sedation. The purpose of our study is to compare CEUS to MRI for evaluation of bowel inflammation in Crohn's disease in pediatric patients.

METHOD AND MATERIALS

Between April 2018 and January 2019, 20 patients, 11 females and 9 males (mean 14.2yr [8mo-20.7yr]) with biopsy proven CD, underwent contrast enhanced MRI (GE Discovery) and CEUS. Greyscale US (Philips, GE or Siemens machine, 9-18L probes) was performed to identify thickened bowel loops, followed by injection of Lumason contrast (Bracco Imaging). CEUS was interpreted by a single radiologist with 15 years experience while the MRIs were interpreted by numerous pediatric radiologists. Enhancement, mucosal disruption, mucosal/submucosal wall thickness, and pericolonic inflammation were noted. Concordance between MRI and CEUS was assessed retrospectively.

RESULTS

CEUS sensitivity to detect bowel inflammation when seen on MRI was 100%. Enhancement concordance was 85% (17/20). The 3 discordant biopsy proven CD cases showed no enhancement or wall thickening on MRI but had thickened enhancing bowel loops on CEUS. Wall thickness was not statistically significant between MRI and CEUS (p=0.25), confidence in accurately measuring mucosal/submucosal layers was possible only with US. Mucosal disruption was more often seen with US (n=10) than MRI (n=2). Pericolonic inflammation was found equally (n=13).

CONCLUSION

In this small sample of pediatric patients, CEUS was superior to MRI in detecting bowel inflammation in CD patients. Bowel US involves using high frequency linear US probes providing detailed evaluation and visualization of bowel wall layers. MRI remains essential for initial diagnosis of CD as CEUS has a limited field of view. Thus, CEUS may have great potential for follow-up.

CLINICAL RELEVANCE/APPLICATION

Contrast enhanced ultrasound has the potential to enhance our ability to detect bowel inflammation and avoid inherent limitations of MRI.

RC413-13 Abdominal Imaging in Children with Failing Fontan Circuits

Tuesday, Dec. 3 5:40PM - 6:00PM Room: E353B

Participants
Govind B. Chavhan, MD, Toronto, ON (*Presenter*) Speaker, Bayer AG

For information about this presentation, contact:

drgovindchavhan@yahoo.com

LEARNING OBJECTIVES

1) To explain hemodynamic disturbances associated with elevated systemic venous pressure in children with Fontan surgery. 2) To discuss abdominal complications in children with failing Fontan circuit. 3) To discuss role of imaging and strategies to optimally image these complications.

SPAI33

RSNA AI Deep Learning Lab: Beginner Class: Classification Task (Intro)

Tuesday, Dec. 3 3:00PM - 4:30PM Room: AI Showcase, North Building, Level 2, Booth 10342

AI BR CH CT GI HN IN MR NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Board of Directors, VoiceIt Technologies, LLC; Stockholder, VoiceIt Technologies, LLC; Board of Directors, FlowSigma, LLC; Officer, FlowSigma, LLC ; Stockholder, FlowSigma, LLC

Special Information

In order to get the best experience for this session, it is highly recommended that attendees bring a laptop with a keyboard and decent-sized screen. Having a Gmail account will be helpful. Here are instructions for creating and deleting a Gmail account.

ABSTRACT

This class will focus on basic concepts of convolutional neural networks (CNNs) and walk the attendee through a working example. A popular training example is the MNIST data set which consists of hand-written digits. This course will use a data set we created, that we call 'MedNIST', and consists of images of 6 different classes: Chest X-ray, Chest CT, Abdomen CT, Head CT, Head MR and Breast MRI. The task is to identify the image class. This will be used to train attendees on the basic principles and some pitfalls in training a CNN. • Intro to CNNs • Data preparation: DICOM to jpeg, intensity normalization, train vs test • How do we choose the labels? Inconsistencies... Use Fast.AI routines to classify; Validation of results: Are the performance metrics reliable? 'Extra Credit': if there is time, explore data augmentation options, effect of batch size, training set size.

Printed on: 10/29/20

SSJ07

Gastrointestinal (Pancreas Diffuse Disease)

Tuesday, Dec. 3 3:00PM - 4:00PM Room: S403B

GI

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

Participants
Temel Tirkes, MD, Indianapolis, IN (*Moderator*) Nothing to Disclose
Kyuran A. Choe, MD, Cincinnati, OH (*Moderator*) Nothing to Disclose

Sub-Events

SSJ07-01 Validation of Apparent Diffusion Coefficient MR Parameters for Differentiation between Mass-Forming Autoimmune Pancreatitis and Pancreatic Ductal Adenocarcinoma

Tuesday, Dec. 3 3:00PM - 3:10PM Room: S403B

Participants
Hainan Ren, BMedSc, Sendai, Japan (*Presenter*) Nothing to Disclose
Naoko Mori, MD, PhD, Sendai, Japan (*Abstract Co-Author*) Nothing to Disclose
Kei Takase, MD, PhD, Sendai, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

renhainan2016@yahoo.co.jp

PURPOSE

Several studies reported the effectiveness of apparent diffusion coefficient (ADC) to differentiate mass-forming autoimmune pancreatitis (AIP) and pancreatic ductal adenocarcinoma (PDAC); however, the results are inconsistent. The purpose of our study was to validate ADC parameters to differentiate the two conditions.

METHOD AND MATERIALS

Twenty-one patients with AIP and 101 patients with PDAC who met the criteria of Japan Pancreas Society 2011 or European Society for Medical Oncology were enrolled in this retrospective study. Regions of interest (ROIs) were placed where the ADCs visually appeared to be most decreased and increased within the lesions on ADC maps to obtain ADCmin and ADCmax. We obtained the secondary derivation as follows: ADCdiff = ADCmax-ADCmin. As for the conventional method, oval or round ROIs to cover entire lesions as much as possible were placed on ADC maps to obtain ADCmean. All the ADC parameters were compared between AIP and PDAC by using Mann-Whitney U test. $P < .05$ was considered significant. After Bonferroni correction of 4 multiple comparisons, the critical value became < 0.0125 (0.05/4).

RESULTS

No significant difference was found in patient background factors including lesion size. The ADCmin, ADCmax, ADCdiff and ADCmean in mass-forming AIP were significantly lower than those in PDAC ($p<0.0001$, $p<0.0001$, $p<0.0001$ and $p<0.0001$, respectively). Receiver operating characteristic curve analysis to differentiate mass-forming AIP from PDAC revealed that area under curves of ADCmin, ADCmax, ADCdiff and ADCmean were 0.76, 0.98, 0.88 and 0.94, respectively. Using the optimal cut-off value 1.38×10-3mm2/sec of ADCmax, sensitivity, specificity, positive predictive value and negative predictive value were 93, 96, 98 and 64 %, respectively. Using the optimal cut-off value 1.23×10-3mm2/sec of ADCmean, sensitivity, specificity, positive predictive value and negative predictive value were 85, 96, 98 and 58 %, respectively.

CONCLUSION

All the ADC parameters showed significant difference between mass-forming AIP from PDAC. Particularly, the diagnostic performance of ADCmax was highest and ADCmax might help in differentiating the two conditions.

CLINICAL RELEVANCE/APPLICATION

ADCmax which was obtained by placing ROI on visually most increased area within the lesion might help in differentiating mass-forming autoimmune pancreatitis and pancreatic ductal adenocarcinoma.

SSJ07-02 Pancreatic T1 Mapping and Extracellular Volume Fraction in Patients with Glucose Intolerance

Tuesday, Dec. 3 3:10PM - 3:20PM Room: S403B

Participants
Yoshifumi Noda, MD,PhD, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose
Satoshi Goshima, MD, PhD, Hamamatsu City, Japan (*Abstract Co-Author*) Nothing to Disclose
Yusuke Tsuji, Kyoto, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroki Imada, Gifu, Japan (*Presenter*) Nothing to Disclose
Kimihiro Kajita, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose
Nobuyuki Kawai, MD, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose
Yuta Akamine, Tokyo, Japan (*Abstract Co-Author*) Employee, Koninklijke Philips NV

Hiroshi Kawada, MD, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose
Yukichi Tanahashi, MD, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose
Masayuki Matsuo, MD, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the feasibility of pancreatic T1 mapping and extracellular volume fraction (ECV) for assessing patients with impaired glucose tolerance (IGT).

METHOD AND MATERIALS

This prospective study was approved by our institutional review board and written informed consent was obtained. Forty-four consecutive patients with known or suspected pancreatic disease underwent contrast-enhanced magnetic resonance (MR) imaging including T1 mapping using saturation recovery sequence. Patients were classified into two groups according to American Diabetes Association criteria: HbA1c < 6.5% (Low value group), and HbA1c >= 6.5% (High value group). Pre-contrast pancreatic T1 value and ECV of the pancreas were computed. Pre-contrast pancreatic T1 value, ECV and HbA1c values were then compared.

RESULTS

HbA1c values positively correlated with pre-contrast pancreatic T1 value and ECV (*r = 0.79, P < 0.001 and r = 0.60, P < 0.001, respectively). The pre-contrast pancreatic T1 value and ECV were significantly higher in High value group than in Low value group (P < 0.0001). Although there was no significant difference between two qualitative values (P = 0.14), the sensitivity, specificity, and area under the receiver-operating-characteristic curve for differentiating High and Low value groups were superior in ECV (100%, 93.5%, and 0.990) compared to pre-contrast pancreatic T1 value (84.6%, 96.8%, and 0.906).*

CONCLUSION

ECV of the pancreas could serve as a potential imaging biomarker for the assessment of pancreatic fibrosis leading to IGT.

CLINICAL RELEVANCE/APPLICATION

Our study demonstrated ECV possibly indicates severity of glucose intolerance. This index may be an important quantitative imaging biomarker for the screening of patients with IGT.

SSJ07-03 *Pancreaticobiliary Lesions Developed in Treated Type 1 Autoimmune Pancreatitis: Nature, Image Pattern, and Risk Factors*

Tuesday, Dec. 3 3:20PM - 3:30PM Room: S403B

Participants
Liang Zhu, MD, Beijing, China (Abstract Co-Author) Nothing to Disclose
Timm Denecke, MD, Berlin, Germany (Abstract Co-Author) Speaker, Bayer AG Travel support, Bayer AG
Patrick Asbach, MD, Berlin, Germany (Abstract Co-Author) Nothing to Disclose
Bernd K. Hamm III, MD, Berlin, Germany (Abstract Co-Author) Research Consultant, Canon Medical Systems Corporation; Stockholder, Siemens AG; Stockholder, General Electric Company; Research Grant, Canon Medical Systems 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
Zheng Yu Jin, MD, Beijing, China (Abstract Co-Author) Nothing to Disclose
Ming He, Beijing, China (Presenter) Nothing to Disclose

For information about this presentation, contact:

zhuliang_pumc@163.com

PURPOSE

To determine the incidence and nature of pancreaticobiliary lesions developed in a prospective cohort of patients with treated type 1 autoimmune pancreatitis (AIP), to evaluate the imaging pattern, and to identify risk factors for disease relapse.

METHOD AND MATERIALS

From a prospectively managed radiological and clinical database (since 2012) of consecutive AIP patients who were treated and followed up (>=18 months) at our institution, patients with pancreaticobiliary lesion(s) development during follow-up were identified. Imaging pattern was compared to the initial attack. Univariate and multivariate analysis was conducted for factors predicting relapse.

RESULTS

Among 103 patients with treated type 1 AIP, 44 (42.7%) patients had pancreaticobiliary lesions during follow up (median time interval to initial diagnosis: 17 months, range 3 to 62 months). The majority of them were after steroid discontinuation (63.6%), the others during maintenance therapy (29.5%) or with steroid tapering (6.8%). All lesions were disease relapse, which responded to steroid treatment. Imaging pattern change was common. Pancreas involvement was less frequent (81.8% vs 100%, p=0.003), and pancreas size was smaller (p<0.01) at relapse. Extra-pancreatic bile duct (ExPanBD) involvement was more severe and extensive at relapse (both p<0.01). Multivariate analysis revealed ExPanBD involvement (hazard ratio 1.976, 95% CI 1.149-3.570, p=0.023) and a lower serum response index (hazard ratio 1.834, 95% CI 1.073-3.322, p=0.037) as significant independent predictors of relapse.

CONCLUSION

AIP relapse is common, often with image pattern change mimicking a new neoplasm. ExPanBD involvement at initial diagnosis and a poorer serum response at the induction phase suggests high risk of relapse.

CLINICAL RELEVANCE/APPLICATION

In treated type 1 AIP, it is not uncommon to observe new pancreaticobiliary lesion development, when the original lesions have

subsided. The lesions may be mass-like, and the image pattern may differ from the initial attack. However, disease relapse is much more likely than development of a new malignancy. Close radiological follow-up shows lesion resolution after re-administration of steroid treatment.

SSJ07-04 Risk Assessment for Pancreatic Fistula after Pancreaticoduodenectomy with Preoperative Computed Tomography

Tuesday, Dec. 3 3:30PM - 3:40PM Room: S403B

Participants
Rossella Menghini, MD, Sermide, Italy (Abstract Co-Author) Nothing to Disclose
Giulia A. Zamboni, MD, Verona, Italy (Presenter) Nothing to Disclose
Marie-Pierre Vullierme, MD, Paris, France (Abstract Co-Author) Nothing to Disclose
Adam J. Cybulski, MD, Verona, Italy (Abstract Co-Author) Nothing to Disclose
Riccardo Valletta, MD, Verona, Italy (Abstract Co-Author) Nothing to Disclose
Giovanni Marchegiani, Verona, Italy (Abstract Co-Author) Nothing to Disclose
Giancarlo Mansueto, MD, Verona, Italy (Abstract Co-Author) Nothing to Disclose

For information about this presentation, contact:

rossella.menghini@gmail.com

PURPOSE

to evaluate the predictive value of preoperative CT features for the risk of postoperative pancreatic fistula.

METHOD AND MATERIALS

this IRB-approved retrospective study included 88 Patients who underwent pancreaticoduodenectomy in two centers. Patients were divided in 2 groups according to clinical data: 44 patients with clinically-relevant postoperative pancreatic fistula (POPF group), and 44 patients without POPF (non-POPF group). One reader experienced in pancreatic imaging (at least 10 years' experience) for each center reviewed the preoperative MDCTs of the patients of the center and measured at the planned resection plane the main pancreatic duct (MPD) diameter, the density of the parenchyma in the different enhancement phases and the parenchymal thickness. The difference in attenuation between the venous and arterial phase was calculated as a surrogate for parenchymal fibrosis: increasing attenuation from the arterial to the venous phase was interpreted as a sign of fibrosis. Body composition was analysed by calculating visceral adipose tissue area (VAT), subcutaneous adipose tissue area (SAT), and skeletal muscle area at the L2-level using ImageJ software. Retrorenal fat thickness and psoas density were also measured. Fisher's exact test was used for categorical variables and Mann-Whitney test for continuous variables.

RESULTS

MPD diameter was 2,7±2,6 mm in the fistula group and 6,3±3,1 mm in non-fistula group (P<0,0001). The mean attenuation difference between venous and arterial phase was 2,6 HU in POPF group and -13,2 HU in non-POPF group (P=0,0010). SAT was 18018,6 mm2 in POPF group and 12269,7 mm2 in non-POPF group (P=0,004). No significant difference observed for the other parameters.

CONCLUSION

fibrosis, expressed by increasing enhancement of the normal pancreatic parenchyma at the planned resection plane, MPD diameter and increased SAT may express increased risk for pancreatic fistula after pancreaticoduodenectomy.

CLINICAL RELEVANCE/APPLICATION

a preoperative assessment based on standard CT imaging of the risk of developing POPF could be useful for patient risk stratification and better and more personalized treatment planning.

SSJ07-06 The Selection of an Optimal Energy Level for Improving Necrosis Depiction in Acute Pancreatitis Using Mono-Energetic Algorithm during Dual-Energy CT of Pancreas

Tuesday, Dec. 3 3:50PM - 4:00PM Room: S403B

Participants
Yuan Yuan, Chengdu, China (Presenter) Nothing to Disclose
Zixing Huang, Chengdu, China (Abstract Co-Author) Nothing to Disclose
Zhenlin Li, MD, Chengdu, China (Abstract Co-Author) Nothing to Disclose
Bin Song, MD, Chengdu, China (Abstract Co-Author) Nothing to Disclose
Liping Deng, Chengdu, China (Abstract Co-Author) Nothing to Disclose
Kai Liao, Chengdu , China (Abstract Co-Author) Nothing to Disclose
Xinyue Chen, London , United Kingdom (Abstract Co-Author) Nothing to Disclose

PURPOSE

To determine optimal energy level using mono-energetic algorithm for necrosis depiction in acute pancreatitis in terms of necrosis conspicuity and image quality during dual-energy CT of pancreas.

METHOD AND MATERIALS

Retrospectively enrolled 48 patients of acute pancreatitis with proven necrosis (24 male and 24 female) between March 2015 and January 2016. The median age was 46 years. Dual-energy (100kVp and Sn140kVp) was performed. And portal venous phase was chosen to be the acquisition phase. Three imaging series (100kVp, Sn140kVp and mixed imaging) were reconstructed automatically after acquisition. In addition 12 Image data sets, at energy levels ranging from 40keV to 150keV (in 10-keV increment) were reconstructed using mono-energetic algorithm. Two radiologists blindly evaluated these 15 image datasets and graded subjective image quality in 4-point scale on a per necrosis basis. Five parameters of image quality, including difference of CT value between pancreatic parenchyma and necrosis, CNR of pancreatic parenchyma-to-necrosis, signal to noise ratio (SNR) of pancreas, image noise and score of subjective diagnosis were compared between image sets. ANOVA and bonferroni correction were used to do the statistic analysis.

RESULTS

The inter-observer agreement was excellent (ICC: 0.8).Difference of CT value between pancreatic parenchyma and necrosis was significantly higher on 40keV images than others(p <0.001), but the score of subjective diagnosis couldn't meet the diagnosis standard. The second was 50keV, and the score could just meet the diagnosis standard. Image noise of 80keV was significantly lower than others(p <0.001),while CNR,SNR and score of subjective diagnosis of 80keV were significantly higher than others respectively(p <0.001).

CONCLUSION

It is demonstrated in the study 50keV image reconstructed by mono-energetic algorithm might improve depiction of necrosis for acute pancreatitis on second generation dual-source scanner, while 80keV image might improve CNR, SNR and image quality.

CLINICAL RELEVANCE/APPLICATION

Since the necrosis is illustrated to be the most serious morphologic findings closely relating to mortality, it is crucial to have a correct assessment of it in acute pancreatitis. Dual-energy CT allows a better delineation of necrosis by applying mono-energetic post-processing. It is suggested to use 50keV as the optimal energy level to detect necrosis of acute pancreatitis.

Printed on: 10/29/20

SSJ08

Gastrointestinal (CT Dose and Abbreviated MR Screening Techniques)

Tuesday, Dec. 3 3:00PM - 4:00PM Room: S401CD

CT GI MR SQ

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

Participants
Jessica B. Robbins, MD, Madison, WI (*Moderator*) Nothing to Disclose
Jeong Hee Yoon, MD, Seoul, Korea, Republic Of (*Moderator*) Research Grant, Bayer AG Speaker, Koninklijke Philips NV Speaker, Bayer AG

Sub-Events

SSJ08-01 Diagnostic Performance and Image Quality of Low-Tube Voltage and Low-Contrast Agent Dose Protocol for Hepatic Dynamic Computed Tomography

Tuesday, Dec. 3 3:00PM - 3:10PM Room: S401CD

Participants
Shintaro Ichikawa, MD, PhD, Chuo, Japan (*Presenter*) Nothing to Disclose
Utaroh Motosugi, MD, Chuo, Japan (*Abstract Co-Author*) Nothing to Disclose
Tatsuya Shimizu, MD, Yamanashi, Japan (*Abstract Co-Author*) Nothing to Disclose
Marie-Luise Kromrey, MD, Greifswald, Germany (*Abstract Co-Author*) Nothing to Disclose
Yoshihito Aikawa, RT, Chuo, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroshi Onishi, MD, Yamanashi, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate diagnostic performance and image quality of low-tube voltage and low-contrast agent dose protocol for hepatic dynamic computed tomography (CT).

METHOD AND MATERIALS

This retrospective study, held between January and May 2018, included 424 patients (mean age, 70.5±10.1 years; 289 men, 135 women). They underwent hepatic dynamic CT using one of two protocols: tube voltage, 80 kVp; contrast dose, 360 mgI/kg, and iterative reconstraction (n=180) and tube voltage, 120 kVp; contrast dose, 600 mgI/kg, and filtered back projection (n=224). Two radiologists independently scored lesion conspicuity and image quality using 5- and 3-point scales, respectively. Another radiologist measured CT number of abdominal organs, musclues, and hepatocellular carcinoma (HCC) in each phase. Lesion detectability, diagnostic ability for HCC, image quality of the arterial phase, CT number including lesion-to-liver ratio, and radiation dose were compared between protocols.

RESULTS

Both protocols showed high lesion detectability (sensitivity, 86.1%-92.5%; specificity, 94.6%-97.3%; accuracy, 92.8%-95.0%) and diagnostic ability for HCC (sensitivity, 85.7%-93.3%; specificity, 93.6%-98.6%; accuracy, 93.3%-96.6%). The 120-kVp protocol showed better image quality for the arterial phase than the 80-kVp protocol (P<0.0001 for both); however, the ratio of fair image quality was not significantly different (P=0.3161 and 0.4084). CT number of abdominal organs and muscles was higher in the 80-kVp protocol than in the 120-kVp protocol in each phase (P<0.0001-0.0357) for all structures, except portal vein in the arterial phase and renal medulla in the portal venous phase (P=0.1760 and 0.1280). Lesion-to-liver ratio was not significantly different for all phases (P=0.2108-0.8653). Volume CT dose index and dose-length product in the arterial phase were significantly lower for the 80-kVp protocol than for 120-kVp protocol (15.2±3.6 vs 32.1±9.3 mGy and 397.3±122.2 vs 880.2±312.7 mGy·cm, respectively, P<0.0001 for both).

CONCLUSION

The 80-kVp protocol has diagnostic performance and image quality, equivalent to the 120-kVp protocol, with lower radiation and contrast agent doses.

CLINICAL RELEVANCE/APPLICATION

Low-tube voltage with iterative reconstruction for hepatic dynamic CT may decrease radiation and contrast agent doses, with equivalent diagnostic performance and image quality than the 120-kVp protocol.

SSJ08-02 Pilot Study to Assess Feasibility of Fast Whole Body MRI Imaging in Oncologic Screening

Tuesday, Dec. 3 3:10PM - 3:20PM Room: S401CD

Participants
Maryam Ghadimi, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose

Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Sanaz Ameli, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Roya Rezvani Habibabadi, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Li Pan, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Vikash Gupta, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

mghadim1@jhu.edu

PURPOSE

Assess the feasibility of whole-body MRI imaging in 30 minutes in oncologic applications.

METHOD AND MATERIALS

Our IRB approved this HIPPA-compliant prospective study. Twenty-six adult patients assessed for metastatic diseases were scanned with WB-DWI methods using a 3T MRI scanner. Axial fat-suppressed T2-weighted (T2WI), DWI, precontrast TS T1-weighted (T1WI) followed by post contrast FS T1WI in the arterial, portal venous and delayed phases were acquired (gradient time of 30 minutes). A single reader utilizing a five-point-scale recorded image quality of each WB-MRI study. Findings on whole-body MRI were recorded. The number of lesions was compared to those detected on CT or PET-CT studies, performed with 12 months of whole-body MRI if available. The WB-MRI, CT, and PET-CT were divided into standard anatomical location including chest, abdomen, and pelvis. The number of lesions within each anatomic location was compared in all three modalities.

RESULTS

Our study included 14 males and 12 females with the mean (±standard deviation) age of 55(±14) years. All whole-body MRI examinations were successfully obtained in the median time of 35 (IQR, 29-39) minutes. There were 17,21 and 8 lesions detected from chest, abdomen and pelvis, respectively in CT studies (N=19). Additionally, total of 0, 3, 2 lesions were detected in the chest, abdomen and pelvis respectively by assessing PET-CT studies (N=5). The WB-MRI detected 15 Lesions in chest, 38 Lesions in abdomen and 8 lesions in pelvis. All lesions detected on PET-CT were also detected on WB-MRI. Four lesions (16%) detected on WB-MRI in abdomen parts were missed on CT, while WB-MRI missed 2 lesions (11%) detected by CT in the chest parts; all were less than 10 mm. These two studies are comparable in detecting lesions in the pelvis. The overall image quality of whole-body MRI was 4/5.

CONCLUSION

We have demonstrated that fast multiparametric WB-MRI may be preformed in approximately 30 minutes, with relatively high image quality. Lung lesions <10mm may not be readily detected by WB-MRI.

CLINICAL RELEVANCE/APPLICATION

Whole-body MRI might be an acceptable alternative for CT or PET, in staging, assessment and monitoring of treatment response in oncologic applications.

SSJ08-03 Assessment of Noise Reduction Potential and Image Quality Improvement of a Deep Learning-Based Image Reconstruction Algorithm in Abdomen CT

Tuesday, Dec. 3 3:20PM - 3:30PM Room: S401CD

Participants
Xiaohu Li, MD, Hefei, China (*Presenter*) Nothing to Disclose
Jianying Li, Beijing, China (*Abstract Co-Author*) Employee, General Electric Company
Huayang Liu, MD, Beijing, China (*Abstract Co-Author*) Employee, General Electric Company
Yongqiang Yu, MD, Hefei, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the image quality improvement and noise reduction in routine dose, non-enhanced abdomen CT imaging by using a deep learning-based image reconstruction algorithm in comparison with ASIR-V .

METHOD AND MATERIALS

9 patients who underwent routine dose, abdomen CT using GE Revolution CT (GE Healthcare, Waukesha, WI) were included . After scanning, all scans were reconstructed with the recommended level of 40% ASIR-V and for comparison purpose and deep learning-based image reconstruction algorithm (TrueFidelityTM, GE Healthcare).DLIR-L, DLIR-M, DLIR-H. The CT attenuation values and SD of the subcutaneous fat, back muscle and descending aorta were measured at the level of tracheal carina of all reconstructed images. The signal-to-noise ratio (SNR) was calculated with SD representing image noise. The subjective image quality was independently evaluated by two experienced radiologists.

RESULTS

For all DLIR images, the objective image noise (SD) of fat, muscle and aorta decreased and SNR increased along with DLIR-L, DLIR-M, DLIR-H. The SD of DLIR images were significantly lower than that of 40% ASIR-V. In terms of subjective image evaluation, all DLIR reconstructions and 40% ASIR-V had good diagnostic acceptability. However, DLIR-M, DLIR-H showed significantly superior visibility of small structures when compared with the 40% ASIR-V and DLIR-L, and DLIR-H was the best series of TrueFidelity images, with a highest subjective image quality, at the same time the image sharpness was not significantly decreased in DLIR-H images.

CONCLUSION

In routine dose, non-enhanced abdomen CT, DLIR show greater potential in reducing image noise and artefacts and maintaining image sharpness when compared to the recommended level of 40%ASIR-V algorithm. Combining both the objective and subjective evaluation of images, non-enhanced abdomen CT images reconstructed with DLIR-H have the highest image quality.

CLINICAL RELEVANCE/APPLICATION

Recently a deep learning-based image reconstruction algorithm has been introduced . This image reconstruction technique employs deep CNN-based models, including millions of trained parameters, to improve the image quality with natural image texture, lower image noise, and high-resolution

SSJ08-04 Deep-Learning-Based Abdominal CT Denoising: Impact of Changes in Reconstruction Parameters Relative to Training Data

Tuesday, Dec. 3 3:30PM - 3:40PM Room: S401CD

Participants
Nathan Huber, Rochester, MN (*Presenter*) Nothing to Disclose
Andrew Missert, PHD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Shuai Leng, PHD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Lifeng Yu, PhD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Cynthia H. McCollough, PhD, Rochester, MN (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

mccollough.cynthia@mayo.edu

PURPOSE

Deep-learning-based CT denoising methods are typically trained on images using a single set of reconstruction parameters. However, reconstruction parameters vary considerably between abdominal CT exam types and practices. This work aimed to quantify the performance of a convolutional neural network (CNN) denoising algorithm when applied to abdominal CT images with reconstruction parameters different from the training data.

METHOD AND MATERIALS

A CNN with 36 convolutional layers was trained on 250,000 image patches clipped from ten contrast-enhanced abdominal CT scans reconstructed with a Siemens' D30 kernel, 3 mm image thickness, and 275 mm field of view (FOV). Supervised learning was used for training, with simulated quarter dose images used as inputs, full dose images as the ground truth, and a mean-squared-error loss function. Six patients were reserved for testing the network. Baseline performance was evaluated with test data that had the same reconstruction parameters as the training data. Without retraining, the network was then applied to data with a range of reconstruction settings: FOV from 100 mm to 450 mm, kernel strength from D10 to D50, and image thickness from 1 to 5 mm. Performance was evaluated by visual assessment, root mean square error, noise level, and spatial resolution. Percent noise reduction was calculated as the difference in noise level from quarter dose to CNN output divided by quarter dose noise level.

RESULTS

The CNN demonstrated 73±6 % noise reduction relative to quarter dose at baseline, with no degradation of spatial resolution (i.e., when test data reconstruction = training data reconstruction). CNN denoising efficacy was decreased, to only 47±5 % noise reduction, when FOV was decreased by 50 mm ($p = 0.0004$), or to only 60±7 % noise reduction, when a smoother (D20) kernel was used ($p = 0.001$). Resolution loss was noted (visual and line profile inspection) when the network was applied to larger FOVs or sharper kernels. CNN performance was largely maintained when applied to test data with different image thicknesses.

CONCLUSION

Performance of the evaluated CNN-based CT denoising method varied significantly with FOV and kernel strength, but not with image thickness.

CLINICAL RELEVANCE/APPLICATION

While impressive noise reduction can be obtained using CNNs, reconstruction parameters must be carefully considered. Improvements in generalizability are therefore necessary.

SSJ08-05 Hepatocellular Carcinoma Screening with Abbreviated MRI: Comparison of Noncontrast, Dynamic-Contrast Enhanced and Hepatobiliary Phase Protocols Post Gadoxetic Acid

Tuesday, Dec. 3 3:40PM - 3:50PM Room: S401CD

Participants
Naik Vietti Violi, Lausanne, Switzerland (*Presenter*) Nothing to Disclose
Sara Lewis, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Joseph H. Liao, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Miriam Hulkower, MD, Bronx, NY (*Abstract Co-Author*) Nothing to Disclose
Gabriela Herandez-Meza, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Katherine Smith, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Xing Chin, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Joseph W. Song, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Eitan Novogrodsky, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Daniela Said, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Shingo Kihira, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Mark Berger, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Maxwell Segall, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Jonathan Rosenblatt, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Mary Sun, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Dillan Villavisanis, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Raphael Golaz, Lausanne, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Keith Sigel, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Bachir Taouli, MD, New York, NY (*Abstract Co-Author*) Research Grant, Bayer AG; Research Grant, Takeda Pharmaceutical Company Limited; Research Grant, Regeneron Pharmaceuticals, Inc; Consultant, Alexion Pharmaceuticals, Inc; Consultant, Bayer AG; ;

For information about this presentation, contact:

bachir.taouli@mountsinai.org

PURPOSE

To compare the performance of reconstructed abbreviated MRI (AMRI) protocols derived from a full gadoxetic acid-enhanced MRI for HCC screening in an at risk population.

METHOD AND MATERIALS

This retrospective study included 237 consecutive eligible patients (M/F 146/91, mean age 58y) with chronic liver disease (cirrhosis or HBV without cirrhosis) who underwent gadoxetic acid MRI in 2017 for HCC screening. Patients with history of HCC/other malignancies, liver transplantation and acute liver disease were excluded. Three reconstructed AMRI sets were assessed separately by 3 independent radiologists: non contrast (NC-AMRI: T2WI HASTE+diffusion weighted imaging (DWI)), Dynamic-AMRI (Dyn-AMRI: T2WI+Dynamic T1WI) and EOB-AMRI (T2WI+DWI +T1WI hepatobiliary phase). Lesions were characterized using a composite scoring system for NC-AMRI and EOB-AMRI [negative, subthreshold (<10mm), positive] and LI-RADS v2018 algorithm was used for Dyn-AMRI. Only LI-RADS5 lesions were considered HCC. A preliminary cost-effectiveness analysis was performed comparing each AMRI set to published ultrasound (US) sensitivity in USA (60%).

RESULTS

The reference standard demonstrated 13/237 patients with HCC (incidence 5.5%, mean size 33.7±30mm, range:10-120mm). Inter-reader agreement was substantial for NC-AMRI and EOB-AMRI (k=0.76 and 0.75) and excellent for Dyn-AMRI (k=0.86). Pooled per-patient sensitivities were 61.5% for NC-AMRI [CIs: 34.4-83%], 84.6% for Dyn-AMRI [60.8-95.1%] and 80.8% for EOB-AMRI [53.6-93.9%], without significant difference between sets (p-values range:0.06-0.16). Pooled per-patient specificities were 95.5% [92.4-97.4%], 99.8% [98.4-100%] and 94.9% [91.6-96.9%], respectively, with a significant difference between Dyn-AMRI and the other sets (p<0.01). All AMRI methods were cost-effective compared to US. Dyn-AMRI was the most cost-effective with incremental cost-effectiveness ratios (ICER) of $11,253 and life-year gain of 11months compared to US.

CONCLUSION

We observed limited sensitivity of NC-AMRI protocol for HCC detection. EOB-AMRI and Dyn-AMRI showed a similar sensitivity with a slightly better specificity and cost-effectiveness for Dyn-AMRI. Further confirmation in a larger study is needed.

CLINICAL RELEVANCE/APPLICATION

Non contrast abbreviated MRI (AMRI) showed low diagnostic performance for HCC screening. AMRI with dynamic T1 (Dyn-AMRI) showed higher specificity and better cost effectiveness compared to AMRI with hepatobiliary phase.

SSJ08-06 Accuracy of an Abbreviated Screening MRI Protocol without Contrast Media for Patients at Risk for Hepatocellular Carcinoma

Tuesday, Dec. 3 3:50PM - 4:00PM Room: S401CD

Participants
Julia Noschang, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Fernando I. Yamauchi, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Thais Mussi, MD,PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Cassia F. Tridente, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Ronaldo H. Baroni, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

julia_noschang@hotmail.com

PURPOSE

To evaluate the accuracy of an abbreviated screening MRI protocol without contrast media for patients at risk for hepatocellular carcinoma (HCC).

METHOD AND MATERIALS

This retrospective study was approved by our institutional review board. Four-hundred and twenty eight MRI exams were performed at our institution in patients with increased risk for hepatocellular carcinoma , from January 2015 to December 2015. Exclusion criteria were: history of treated HCC (166 cases) and subsequent studies of the same patient (123 cases). A total of 139 MRI cases were anonymized without post-contrast series (abbreviated protocol) and retrospectively analysed by three radiologists with different levels of experience (10, 8 and 1 year of experience with abdominal MRI). Later, one senior radiologist re-evaluated the full protocol as the reference standard, using LI-RADS v.2018. The abbreviated protocol included T2 weighted, fat-saturated T2 weighted, diffusion-weighted and GRE in/out-of-phase sequences. The following criteria were evaluated: presence of nodule suspicious for HCC, lesion size, lesion location and presence of nodule on each MRI sequences of the abbreviated protocol.

RESULTS

One-hundred and thirty nine patients were included, 38 women and 101 men, with an average age of 54.1 years. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of abbreviated protocol for detection of nodules categorized as LI-RADS 4 and 5 (reference standard) were: 88.3%, 77.2%, 74.6%, 89.7% and 82.0% (most experienced reader), 85.0%, 78.5%, 75.0%, 87.3% and 81.3% (intermediate experienced reader) and 85.0%, 73.4%, 70.8%, 86.6% and 78.4% (less experienced reader), respectively. Interobserver agreement was moderate for lesion detection (weighted K= 0.57, CI=0.41-0.78). The sensitivity of each MRI sequence was 71.7%, 73.3% and 76.7% on T2-weighted, 68.3%, 75.0% and 73.3% in fat-saturated T2-weighted, 76.7%, 75.0% and 73.3% in in/out-of-phase and 63.3%, 70.0% and 68.3% in DWI for most experienced, intermediate experienced and less experienced readers, respectively.

CONCLUSION

The abbreviated MRI protocol demonstrated high sensitivity for hepatocellular carcinoma screening in risk patients.

CLINICAL RELEVANCE/APPLICATION

HCC is the most common primary malignancy of the liver and a common cause of death from cancer worldwide. Abbreviated MRI protocol possibly allows more cost-effective, high sensitivity imaging for HCC screening.

Printed on: 10/29/20

SSJ09

Gastrointestinal (Quantitative Imaging Techniques)

Tuesday, Dec. 3 3:00PM - 4:00PM Room: S403A

BQ GI

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

Participants
Alexander R. Guimaraes, MD, PhD, Portland, OR (*Moderator*) Speakers Bureau, Siemens AG; Consultant, Takeda Pharmaceutical Company Limited; Consultant, Merck & Co, Inc; Consultant, Agfa-Gevaert Group; Consultant, PAREXEL International Corporation; Rajan T. Gupta, MD, Durham, NC (*Moderator*) Consultant, Bayer AG; Speakers Bureau, Bayer AG; Consultant, Invivo Corporation; Consultant, C. R. Bard, Inc

Sub-Events

SSJ09-01 Evaluation of Hepatic Perfusion in Pancreatitis Patients by 3rd-Generation Dual-Source Computed Tomography

Tuesday, Dec. 3 3:00PM - 3:10PM Room: S403A

Participants
Xilin Lan, MD, Deyang, China (*Presenter*) Nothing to Disclose
Bing Ming II, MD, Deyang, China (*Abstract Co-Author*) Nothing to Disclose
Shiyong Zhang, Deyang, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

lan618113@126.com

PURPOSE

A number of studies have demonstrated that acute pancreatitis (AP)can result in liver damage, which is often without obvious clinical symptoms, but plays an important role in the progression of AP and other organ damage.Fewer studies published about the difference in hepatic perfusion parameters in patients with AP, Therefore, we quantitatively investigated hepatic perfusion in patients with mild AP(MAP) and severe AP (SAP)compared to control group using perfusion CT.

METHOD AND MATERIALS

The clinical and abdominal CT data on all patients were retrospectively analyzed, including 61 patients with AP and 15 cases as a control group,and the AP group further classified into mild AP(26 cases)and severe AP(35 cases) according to CT severity index (CTSI).Upper abdomen perfusion CT imaging was performed in all cases by 3rd-generation dual-source CT. Perfusion CT imaging was obtained for 54 s beginning with a bolus injection of 60 ml of contrast agent (600-630 mgI/kg) at a flow rate of 5 ml/s. Perfusion data were analyzed by the deconvolution method to obtain blood flow(BF, mL/100mL/min),blood volume(BV, mL/100mL),arterial liver perfusion (ALP, mL/100mL/min) , portal venous liver perfusion (PVP, mL/100mL/min),mean transit time(MTT,s) and hepatic perfusion index(HPI,%). Finally, hepatic perfusion parameters were compared for any significant ($P < 0.05$) differences among mild AP patients, severe AP patients and control group.

RESULTS

Various perfusion parameters was significantly higher in the control group than severe AP patients (BF:p=0.002 BV:p=0.000, PVP:p=014,MTT:p=0.000,HPI:p=0.039, $p < 0.05$; ALP: p=964>0.05). There was no significant difference in various perfusion parameters between mild AP patients and the control group ,except in MTT(8.53±0.92s vs 7.59±1.30s,p=0.018).

CONCLUSION

Using quantitative analysis on hepatic perfusion CT, we demonstrated the decrease of various hepatic perfusion parameters ,namely hepatic blood perfusion in SAP, responding to the changes in hepatic hemodynamics in SAP,hepatic perfusion CT is useful for evaluation and prediction of liver damage in patients with SAP.

CLINICAL RELEVANCE/APPLICATION

(dealing with adjunct to imaging) ' In patients with pancreatitis, CT liver perfusion imaging is a non-invasive method to help assess hemodynamics and microvascular changes in the liver.'

SSJ09-02 Comparative Effectiveness of Noninvasive Tests for Staging Chronic Liver Disease

Tuesday, Dec. 3 3:10PM - 3:20PM Room: S403A

Participants
Kevin A. Zand, MD, Jackson, MS (*Presenter*) Nothing to Disclose
Elliot Varney, MD, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose
Blake Becker, MD, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose
Seth Lirette, MS, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose
David Gordy, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose
Edward Florez, PhD, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose

Judd M. Storrs, PhD, Jackson, MS (*Abstract Co-Author*) Consultant, ABSIST LLC
Akash M. Patel, MD, MBBS, Madison, MS (*Abstract Co-Author*) Nothing to Disclose
Manohar Roda, MD, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose
Candace M. Howard-Claudio, MD, PhD, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

chowardclaudio@umc.edu

PURPOSE

To prospectively compare the diagnostic performance of multiple noninvasive tests for staging hepatic fibrosis in patients with chronic liver disease using histology as the reference standard

METHOD AND MATERIALS

This is a single-center, IRB-approved, HIPAA-compliant, prospective pilot study. Adults with chronic liver disease presenting to Interventional Radiology for random liver biopsy are enrolled prior to biopsy. Ultrasound shear-wave elastography of the liver is performed using a Philips scanner with standard acquisition parameters to measure liver stiffness (USE). MR elastography of the liver is performed using a 1.5 T Siemens scanner with standard acquisition parameters to measure liver stiffness (MRE). All patients undergo CT-guided liver biopsy and obtained CT images of the liver are used to measure liver surface nodularity (LSN score) using a previously described semi-automated method. Serum labs within 30 days of liver biopsy are used to calculate the FIB-4 score, a serum biomarker of hepatic fibrosis. The concordance of FIB-4 score, LSN score, USE, and MRE with histologic Metavir staging of hepatic fibrosis are assessed using Harrell's C statistics. Odds Ratios (OR) from ordinal logistic models are reported.

RESULTS

The preliminary data includes fifteen adults (11 female; age range 34 - 72, mean 55). Mean interval between liver biopsy and ultrasound/MR is 0 days. The histologic range of hepatic fibrosis includes 7 livers with no fibrosis (F0), 3 with mild-moderate fibrosis (F1-2), and 5 with advanced fibrosis-cirrhosis (F3-4). Mean and range of FIB-4 score are 1.7 (0.5 - 4.4). Mean and range of LSN score are 2.7 (2.0 - 4.1). Mean and range of hepatic stiffness measured by USE and MRE are 8.8 kPa (3.9 - 17.9) and 5.4 kPa (2.4 - 15.7), respectively. The C-stat concordance for FIB-4 score, LSN score, USE, and MRE are 0.84, 0.87, 0.77, and 0.85 respectively. Odds of moving up one fibrosis stage are 3.84 (p=0.013), 69.8 (p=0.005), 1.01 (p=0.267), and 1.53 (p=0.019), respectively, per one unit increase.

CONCLUSION

In this pilot study, liver surface nodularity score has non-inferior diagnostic performance compared to FIB-4 score, USE, or MRE in staging hepatic fibrosis in patients with chronic liver disease.

CLINICAL RELEVANCE/APPLICATION

Liver surface nodularity score may serve as a quantitative biomarker for staging hepatic fibrosis in patients with chronic liver disease.

SSJ09-03 Quantifying Non-Alcoholic Fatty Liver: Liver-Spleen CT Ratio or Fat Concentration in Dual-Energy Spectral CT? Accuracy Comparison with Magnetic Resonance Q-Dixon Technique

Tuesday, Dec. 3 3:20PM - 3:30PM Room: S403A

Participants
Zhang Min, Xianyang, China (*Presenter*) Nothing to Disclose
Jianying Li, Beijing, China (*Abstract Co-Author*) Employee, General Electric Company
Nan Yu, MD, Xianyang, China (*Abstract Co-Author*) Nothing to Disclose
Ma Chunling, MMed, Xianyang City, China (*Abstract Co-Author*) Nothing to Disclose
Hui Yuan, Xianyang, China (*Abstract Co-Author*) Nothing to Disclose
Lei Yuxin, MMed, Xianyang City, China (*Abstract Co-Author*) Nothing to Disclose
Yong Yu, Xianyang City, China (*Abstract Co-Author*) Nothing to Disclose
Dong Han, MD, Xianyang, China (*Abstract Co-Author*) Nothing to Disclose
Wanqiong Wang, Xianyang, China (*Abstract Co-Author*) Nothing to Disclose
Mengting Yu, Shaanxi, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

3264730242qq.com

PURPOSE

To compare the accuracy of using conventional liver-spleen (LS) CT ratio or fat concentration (FC) in spectral CT to quantify non-alcoholic fatty liver using the fat fraction (FF) determined using magnetic resonance Q-dixon (MRQd) technique as a reference standard.

METHOD AND MATERIALS

Retrospectively analyzed 80 liver patients with both MRQd and spectral CT within one week. Using MRQd results, patients were divided into normal and fatty liver groups (normal: n=20, FF<5%; mild: n=26, FF=5%-10%; moderate: n=20, FF=11%-25%; and severe: n=14, FF>25%). The liver FC was measured on the lipid-based material decomposition images in spectral CT by 2 senior abdominal radiologists by placing regions of interest in two different hepatic lobes over 7 image slices centered at the hepatic portal level. Final FC values were obtained by averaging the measurements. The two doctors also measured the LS CT ratio on the 70keV images. Measurements were repeated three times weekly to evaluate the repeatability using intra-group or inter-group correlation coefficient (ICC). The correlation between MRQd and spectral CT results was analyzed. The diagnostic efficacy of using FC in spectral CT for differentiating normal and mild fatty livers was tested by ROC curve.

RESULTS

The ICC values were high indicating consistent measurements. There were differences in FC between any groups (P<0.05), while the LS ratio was not significantly different between the normal and mild fatty liver group (p>0.05). There was a positive correlation

between FC in spectral CT and FF in MRQd (r=0.959, P<0.001), and a negative correlation between LS ratio and FF (r=-0.848, P<0.001). ROC curve analysis showed that with a FC cut-off value of 351.19mg/ml, the sensitivity, specificity and area under curve were 95%, 100% and 0.990, respectively in differentiating the normal and fatty liver group.

CONCLUSION

The fat concentration in spectral CT has excellent correlation with the fat fraction by MR Q-dixon and is better than that determined by liver-spleen CT ratio. FC in spectral CT has high accuracy to differentiate normal and fatty livers for non-alcoholic fatty liver patients.

CLINICAL RELEVANCE/APPLICATION

The fat concentration measurement in spectral CT can replace the Liver-Spleen CT Ratio as an imaging method for the diagnosis of fatty liver, and its accuracy is high.

SSJ09-04 MRE Practice Improvement: Comparison of Clinical MRE Liver Stiffness Measurements Made by MR Technologists versus Expert MRE Analysts

Tuesday, Dec. 3 3:30PM - 3:40PM Room: S403A

Participants
Walter Henderson, La Jolla, CA (*Presenter*) Nothing to Disclose
Chetan Potu, La Jolla, CA (*Abstract Co-Author*) Nothing to Disclose
Danielle N. Batakis, BS, La Jolla, CA (*Abstract Co-Author*) Nothing to Disclose
Vivian Montes, La Jolla, CA (*Abstract Co-Author*) Nothing to Disclose
Alexandra A. Schlein, BS, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Tanya Wolfson, MS, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Claude B. Sirlin, MD, San Diego, CA (*Abstract Co-Author*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc
Kathryn J. Fowler, MD, San Diego, CA (*Abstract Co-Author*) Consultant, 12 Sigma Technologies; Researcher, Nuance Communications, Inc; Contractor, Midamerica Transplant Services; ;

For information about this presentation, contact:

wahenderson@ucsd.edu

PURPOSE

MR elastography (MRE) is increasingly used clinically to noninvasively assess hepatic stiffness, an imaging biomarker used to detect and monitor liver fibrosis. Although MRE is well studied in research settings, less is known about its performance in clinical settings where measurements are typically made by MR technologists who may be unfamiliar with the analysis. As part of a quality practice improvement project, we compared liver stiffness measurements made by MR technologists on clinical MRE exams with those made by expert MRE analysts.

METHOD AND MATERIALS

We retrospectively identified 46 MRE slices from 10 patients (60% female, age 27 to 69) who underwent 3T clinical MRE exams (2D SE-EPI at 60 Hz) at our institution. The MR technologist who performed each exam analyzed each MRE slice using commercial clinical analysis software on the GE scanner console by drawing regions of interest (ROIs) on the liver. Two expert MRE analysts (each with >= 300 research MRE exams analyzed) also analyzed the MRE slices, drawing ROIs according to QIBA MRE analysis guidelines using MRE-Quant analysis software (Mayo Clinic). Mean stiffness values (kPa) measured by MR technologists and expert analysts were compared pairwise by intraclass correlation coefficient (ICC) and Bland-Altman analyses, using bootstrap-based tests to adjust for within-patient dependence.

RESULTS

ICC between analysts (0.981) was higher than between technologists vs Analyst 1 (0.857, p<0.001) and vs Analyst 2 (0.869, p<0.001). MRE measurements by MR technologists were 0.39 (p<0.001) and 0.30 (p<0.001) kPa lower than those by Analyst 1 and 2, respectively, with limits of agreement (LOA) of (-1.52, 0.73) and (-1.46, 0.85) kPa. Bias between analysts (0.09 kPa, LOA [-0.45, 0.63 kPa]) was small but significant (p=0.002).

CONCLUSION

In clinical patients, there is less agreement in MRE stiffness measurements between MR technologists and expert MRE analysts than between two expert analysts. Compared to expert analysts, MR technologists underestimate liver stiffness. Research is needed to determine whether additional MR technologist experience and/or training will improve agreement between their measurements and those made by expert analysts.

CLINICAL RELEVANCE/APPLICATION

Stiffness measurements by MR technologists may differ meaningfully from those by expert analysts. Additional training may be required before MR technologists' measurements are reported clinically.

SSJ09-05 Prediction of Liver Regeneration in Recipients after Adult-To-Adult Living Donor Liver Transplantation Using Preoperative CT Texture Analysis

Tuesday, Dec. 3 3:40PM - 3:50PM Room: S403A

Participants
Jung Hoon Kim, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Junghoan Park, MD , Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

Ji-Eun Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sang Joon Park, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Joon Koo Han, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jhkim2008@gmail.com

PURPOSE

To predict the rate of liver regeneration in recipients after living donor liver transplantation (LDLT) using preoperative CT texture and shape analysis of the future graft.

METHOD AND MATERIALS

103 donor-recipient pairs who underwent LDLT using right lobe graft were retrospectively included for this study. All donors underwent preoperative liver CT using same CT scanner. We semi-automatically segmented the right lobe of the liver which was to be a future graft using commercially available software. The volume of the future graft (Vpre) was measured and texture and shape analysis of Vpre was performed. All recipients underwent follow-up CT (mean, 12.0 ± 1.1 months) after surgery. The graft liver was segmented in the same manner, and the volume of the graft (Vpost) was measured. The regeneration index (RI) was defined by the following equation: [(Vpost-Vpre)/Vpre]×100 (%). We performed a stepwise, multivariate linear regression analysis to investigate the correlation between clinical features, texture and shape parameters and RI, and made the best-fit model for predicting RI.

RESULTS

The mean RI was 49.8 ± 44.7%. In the univariate analysis, Vpre, effective diameter, surface area, sphericity, roundness, compactness, energy and grey level co-occurrence matrix inverse difference moment (GLCM IDM) were significantly correlated with RI ($p<0.05$). In the multivariate analysis, Vpre (ß, -0.121, 95% CI: -0.176 - -0.066) and roundness_m (ß, -1.34, 95% CI: -2.67 - -0.01) as well as the sex (ß, 27.75, 95% CI: 10.60 - 44.91) of the donor and preoperative serum protein (ß, 9.85, 95% CI: 0.74 - 18.97) were shown to be independent predictors of RI ($p<0.05$). The best-fit predictive model for RI was as follows: RI (%) = 71.50 + 9.85×preoperative serum protein (g/dL) - 0.121×Vpre (mL) - 1.34×roundness_m (+ 27.75, if donor is female), where roundness_m = (roundness-0.780)×1,000.

CONCLUSION

Texture and shape parameters of the liver including Vpre and roundness were associated with liver regeneration. Preoperative CT texture and shape analysis of the future graft can be useful for predicting the rate of liver regeneration in recipients after LDLT.

CLINICAL RELEVANCE/APPLICATION

Preoperative CT texture and shape analysis of the future graft can help predict liver regeneration in recipients and assist in the surgical planning of LDLT.

SSJ09-06 Diffusion Kurtosis Imaging-Derived Histogram Metrics for Prediction of KRAS/NRAS Mutations in Rectal Adenocarcinoma: Preliminary Findings

Tuesday, Dec. 3 3:50PM - 4:00PM Room: S403A

Participants
Yanfen Cui, Taiyuan, China (*Presenter*) Nothing to Disclose
Xiaotang Yang, Taiyuan, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yanfne210@126.com

PURPOSE

Objective: To evaluate the potential role of diffusion kurtosis imaging (DKI)-derived parameters by using histogram analysis derived from whole-tumor volumes for prediction of the status of KRAS/NRAS mutations in patients with rectal adenocarcinoma.

METHOD AND MATERIALS

152 consecutive patients with rectal adenocarcinoma who underwent MRI examination including DKI (b values: 0, 700, 1400, and 2100 sec/mm2) were retrospectively evaluated. The quantitative parameters of D, K, and conventional apparent diffusion coefficient (ADC) were measured using whole-tumor volume histogram analysis. Student's t-test or Mann-Whitney U-test, receiver operating characteristic (ROC) curves, and Spearman's correlation were used for statistical analysis.

RESULTS

All the percentiles metrics of ADC and D values were significantly lower in the mutated group than those in the wild-type group (all $P< 0.05$), except for the minimum value of ADC and D (both $P > 0.05$), while K-related percentiles metrics were higher in the mutated group compared with those in the wild-type group (all $P< 0.05$). Regarding the comparison of the diagnostic performance of all the histogram metrics, K75th showed the highest AUC value of 0.866, and the corresponding values for sensitivity, specificity, PPV, and NPV were 67.57% and 92.31%, 89.29%, and 75.0%, respectively.

CONCLUSION

It was revealed that DKI metrics with whole-tumor volume histogram analysis, especially the K75th parameter, yielded more preferable AUC and specificity values for predicting KRAS/NRAS mutations than ADC and D values, and thus may potentially serve as an optimal imaging biomarker for the prediction of KRAS/NRAS/BRAF mutations for guiding targeted therapy.

CLINICAL RELEVANCE/APPLICATION

DKI metrics with whole-tumor volume histogram analysis, especially the K75th parameter, may potentially serve as an optimal imaging biomarker for the prediction of KRAS/NRAS mutations

SSJ24

Radiation Oncology (Gastrointestinal Malignancies)

Tuesday, Dec. 3 3:00PM - 4:00PM Room: S402AB

GI RO

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

Participants
Edward Y. Kim, MD, Seattle, WA (*Moderator*) Nothing to Disclose
Tarita O. Thomas, MD,PhD, Maywood, IL (*Moderator*) Nothing to Disclose

Sub-Events

SSJ24-01 Radiomics of Sulfur Colloid SPECT/CT to Predict Radiation-Induced Hepatotoxicity in Hepatocellular Carcinoma Patients

Tuesday, Dec. 3 3:00PM - 3:10PM Room: S402AB

Participants
Stephanie K. Schaub, MD, Seattle, WA (*Presenter*) Nothing to Disclose
Daniel S. Hippe, MS, Seattle, WA (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV; Research Grant, General Electric Company; Research Grant, Canon Medical Systems Corporation; Research Grant, Siemens AG
Stephen R. Bowen, PhD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Landon Wootton, PHD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Art Chaovalitwongse, PhD, Fayetteville, AR (*Abstract Co-Author*) Nothing to Disclose
Paul E. Kinahan, PhD, Seattle, WA (*Abstract Co-Author*) Research Grant, General Electric Company Co-founder, PET/X LLC
Smith Apisarnthanarax, MD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Matthew J. Nyflot, PhD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

skschaub@uw.edu

PURPOSE

Wide variability exists in our ability to predict radiation-induced liver disease (RILD) in hepatocellular patients (HCC) treated with radiotherapy (RT). An unmet need exists for objective metrics to risk stratify patients, especially among those at highest risk with baseline Child-Pugh (CP)-B/C cirrhosis. We hypothesized that a radiomic signature derived from 99m-Tc sulfur colloid sulfur colloid (SC) SPECT/CT scans could inform on RILD risk prediction in HCC patients.

METHOD AND MATERIALS

92 consecutive HCC patients with underlying cirrhosis treated with RT (n=45 SBRT; n=47 proton RT) were retrospectively reviewed for clinical data including CP score, prior liver-directed therapy (LDT), vascular invasion, gross tumor volume (GTV), and RILD-specific death. Pre-treatment SC SPECT imaging of the uninvolved liver was mined to obtain 33 radiomic features. Univariate analysis was performed using Fine & Gray competing risk regression models to evaluate associations between radiomic features and RILD-death, with tumor progression, additional LDT, and non-RILD deaths treated as competing risks. Bonferroni multiple testing adjustment was applied such that a=0.05/33.

RESULTS

Patients had 33% CP-B/C class, 32% vascular invasion, 52% prior LDT, and median GTV was 33cc. During a median follow-up of 11 months, 8 RILD-related deaths occurred, all in patients with CP-B/C. 24/33 radiomic features were significantly associated with RILD-death ($p<0.0015$), with the strongest predictors being dissimilarity and zone percentage (both HR 0.1 per 1-SD increase), which measure image heterogeneity at the locoregional level. In contrast, the only clinical feature predictive of RILD-death was CP-B/C. Within the CP-B/C subgroup (n=30), 8 features retained statistical significance for RILD-death risk prediction, with kurtosis being the most significant (HR 1.4, $p<0.0001$). Among these patients, 6/15 with kurtosis above the median had RILD-death compared with 2/15 with kurtosis below the median. Further multivariate analysis was not performed due to few RILD-deaths.

CONCLUSION

Radiomic SC SPECT signatures may provide an objective biomarker for predicting RILD-specific death that may further stratify risk beyond Child-Pugh class.

CLINICAL RELEVANCE/APPLICATION

Radiomic signatures derived from pre-treatment sulfur colloid SPECT/CT may offer improved hepatotoxicity risk prediction in hepatocellular carcinoma patients treated with radiotherapy.

SSJ24-02 Recurrence and Patient-Related Factors in Hepatocellular Carcinoma Patients Treated with Stereotactic Body Radiation Therapy

Tuesday, Dec. 3 3:10PM - 3:20PM Room: S402AB

Awards

Trainee Research Prize - Resident

Participants
Mona Arbab, MD, Indianapolis, IN (*Presenter*) Nothing to Disclose
Anirudh Yalamanchali, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose
Mary Maluccio, MD, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose
Feng-Ming Kong, MD,PhD, Cleveland, OH (*Abstract Co-Author*) Speakers Bureau, Varian Medical Systems, Inc
Susannah Ellsworth, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose
Ryan Rhome, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

marbab@iu.edu

PURPOSE

Stereotactic Body Radiation Therapy (SBRT) is used in patients with HepatoCellular Carcinoma (HCC).In this study,we evaluate factors associated with failure.

METHOD AND MATERIALS

This is a retrospective analysis of HCC patients treated between 6/2007 and 1/2017. Failure was defined as: in-field (within 80% isodose line), out-field (outside 80% isodose line within the liver), and distant (outside the liver). Biological effective dose (BED) was calculated using alpha/beta = 10. Absolute lymphocyte count (ALC) nadir was defined as the lowest ALC within 2 months after SBRT and low ALC nadir was described as ALC <0.5 k cell/uL. Statistical analysis was done using chi-squared testing, logistic regression, and Kaplan-Meier methods.

RESULTS

113 patients with a median age of 63 years (IQR 57-69 years) were included. 71% were male; 72% had Child Pugh A, 61% had ECOG of 1 and 13.2% received liver transplant. The most common cause of HCC was hepatitis C (59%).The median tumor size was 25 mm (range 11-148 mm). The median dose of SBRT was 46.5 Gy (range 20-50 Gy) with median BED of 112.5 (range of 72-124.8). With median follow-up of 22 months (range 0-122), 26 (23%) of patients had failure: 5 (19%) were in-field, 16 (62%) were out-field, and 7 (27%) were distant metastases. 2 patients had concurrent in- and out-field failure. Progression free survival was 20.5 months (range 2-97 months) and the mortality rate was 36% and 54% in patients with any type of failure. In univariate analysis, pre-treatment alpha fetoprotein (AFP), on-treatment AFP and International Normalized Ratio (INR) were associated with risk of any failure (p=0.02, p=0.04 and p=0.04). 3-month post-treatment AFP was associated with risk of distant failure (p=0.03). Pre-treatment AFP was associated with any failure in multivariate analysis (p=0.01). BED or dose were not associated with any failure. Patient with low ALC nadir had lower overall survival (OS, 14.5 months versus 28 months, p-value=0.006). OS decreased to 9.5 months in patients with ALC nadir of <0.2 k cell/uL. In-field failure was associated with improved OS (p=0.03) and distant failure with higher rate of mortality (p=0.0001).

CONCLUSION

Pre-RT and on-treatment AFP in addition to INR can predict future failure. Survival can be impacted by low ALC nadir.

CLINICAL RELEVANCE/APPLICATION

Pre-RT AFP and INR can predict failure.Lower ALC nadir can impact survival in HCC patients treated with SBRT.

SSJ24-03 Developing a Prediction Model Based on MRI for Pathological Complete Response after Neoadjuvant Chemoradiotherapy in Locally-Advanced Rectal Cancer

Tuesday, Dec. 3 3:20PM - 3:30PM Room: S402AB

Participants
Lijuan Wan, Beijing, China (*Presenter*) Nothing to Disclose
Chongda Zhang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Hongmei Zhang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

lijuanwan1993@163.com

PURPOSE

The aim of this study was to build an appropriate diagnostic model for predicting pathological complete response (pCR) after neoadjuvant chemoradiotherapy (nCRT) in patients with locally advanced rectal cancer (LARC) by combining magnetic resonance imaging (MRI) parameters with clinical factors.

METHOD AND MATERIALS

Eighty-four patients with LARC who underwent MR examination before and after nCRT were enrolled in this study. MRI parameters including cylindrical approximated tumor volume (CATV) and relative signal intensity of tumor (rT2wSI) were measured, corresponding reduction rates (RR) were calculated, as well as MR tumor regression grade (mrTRG) and other conventional MRI parameters were assessed. Logistic regression analysis with lasso regularization were performed and the appropriate prediction model for pCR was built up. An external cohort of thirty-six patients was used as the validation group for testing the model. Receiver operating characteristic (ROC) analysis was used to assess the diagnostic performance.

RESULTS

In the development and the validation group, 17 patients (20.2%) and 11 patients (30.6%), respectively, achieved pCR. Two CATV related parameters (CATVpost and CATVRR), one rT2wSI related parameters (rT2wSIRR), and mrTRG were the most important parameters for predicting pCR and were retained in the diagnostic model. In the development group, the area under the receiver-operating characteristic curve (AUC) for predicting pCR is 0.88 (95% CI 0.78-0.97, p<0.001), with a sensitivity of 82.4% and a specificity of 83.6%. In the validation group, the AUC is 0.84 (95% CI 0.70-0.98, p=0.001), with a sensitivity of 81.8% and a specificity of 76.0%.

CONCLUSION

A diagnostic model including CATVpost, CATVRR, rT2wSIRR, and mrTRG was useful for predicting pCR after nCRT in patients with LARC and can increase the confidence of the organ-preserving strategy.

CLINICAL RELEVANCE/APPLICATION

Our study dealt with building an appropriate diagnostic model for predicting pCR in patients with LARC. We proved that parameters like cylindrical approximated tumor volume (CATV) after nCRT (CATVpost) and reduction rate of CATV (CATVRR) are also useful in assessing pCR. These findings could contribute to the medical community by enabling prescription of a patient-tailored treatment.

SSJ24-04 Evaluation of Pre-Treatment MR Elastography for the Prediction of Radiation-Induced Liver Disease

Tuesday, Dec. 3 3:30PM - 3:40PM Room: S402AB

Participants
Kay Pepin, PhD, Rochester, MN (*Presenter*) Employee, Resoundant Inc
Jaden D. Evans, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Trey C. Mullikin, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Sudhakar K. Venkatesh, MD, FRCR, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Richard L. Ehman, MD, Rochester, MN (*Abstract Co-Author*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc;
Kenneth W. Merrell, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Michael G. Haddock, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Michael G. Herman, PhD, Rochester, MN (*Abstract Co-Author*) Research Grant, Varian Medical Systems, Inc
Christopher L. Hallemeier, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

pepin.kay@mayo.edu

PURPOSE

MR elastography (MRE) is an established noninvasive imaging technique for quantifying liver stiffness for diagnosing fibrosis. The study purpose was to evaluate whether liver stiffness (LS) using MRE is associated with risk of developing radiation induced liver disease (RILD) in patients receiving radiation therapy (RT) for liver tumors.

METHOD AND MATERIALS

We identified patients who received RT (>=20 Gy) between 2010 and 2018 for primary liver cancer (hepatocellular or cholangiocarcinoma) or liver metastases, had an MRE exam <=6 months prior to RT, and had post-RT labs. LS was calculated as the mean across ROIs on 4 MRE slices. Based on previous studies, LS<3 kPa was considered normal and LS>=3.0 kPa as representing fibrosis. RILD was defined as an increase in Child-Pugh (CP) score of >=2 from baseline within 6 months of RT. Univariate Cox models were used to assess correlation.

RESULTS

95 patients were identified. Median age: 65 years, range [30,87]. 48 had primary liver cancer and 47 had liver metastases. Mean pre-RT LS was 3.9 kPa [1.8, 8.7]. Mean LS for patients with primary vs. metastatic tumors was 5.0 kPa vs 3.0 kPa (p<0.001). 19 patients (20%) developed RILD. Mean pre-RT LS was 5.1 kPa for patients who developed RILD vs. 3.6 kPA for patients who did not. Pre-RT LS>3.0 kPa was associated with increased risk of post-RT RILD (hazard ratio (HR) 9.3, 95% confidence interval (CI) 2.1, 40.4; p=0.003). Kaplan Meier analysis showed that 6-month survival-free of RILD for baseline LS<=3.0 kPa was 91% (95% CI: 76, 100) compared to 52% (95% CI: 35, 76) for LS>3.0 kPa. Additionally, BMI (HR 1.12 per 1 point BMI; 95% CI: 1.0, 1.2; p=0.005) and presence of cirrhosis (histologic or clinical evidence) (HR 4.9, 95% CI: 1.8, 12.0; p=0.002), were correlated with the development of post-RT RILD; whereas age, gender, CP score, gross tumor volume, and RT parameters (dose, fractions, or modality) were not significantly associated with risk of RILD.

CONCLUSION

Elevated pre-RT LS measured by MRE was associated with an increased risk of RILD in patients receiving high dose RT for liver tumors.

CLINICAL RELEVANCE/APPLICATION

Risk of radiation-induced liver disease (RILD) has limited the use of radiation therapy for management of liver cancer; MRE determined pre-RT liver stiffness may be a non-invasive predictor of RILD.

SSJ24-05 Early Results of Radiographic Response and Clinical Outcomes with 177Lu-DOTATATE in a Real-World Academic Clinical Practice

Tuesday, Dec. 3 3:40PM - 3:50PM Room: S402AB

Participants
Sai Duriseti, MD,PhD, St. Louis, MO (*Presenter*) Nothing to Disclose
Michael C. Roach, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Hyun Kim, MD, Saint Louis, MO (*Abstract Co-Author*) Research Grant and Speakers Bureau, Varian Medical Systems, Inc; Research Grant and Speakers Bureau, ViewRay, Inc

PURPOSE

Treatment of advanced midgut neuroendocrine tumors with 177Lu-DOTATATE improves outcomes compared to octreotide alone as 2nd line therapy as demonstrated in the recent NETTER-1 trial. After its FDA approval, an increasing number of centers are implementing this therapy. Here we describe early efficacy of this treatment in the Department of Radiation Oncology at Washington University in St. Louis School of Medicine, including initial uptake verification, quantitative radiographic response, and early clinical outcomes with respect to patient clinical status and early serologic response.

METHOD AND MATERIALS

Patients were treated with 200 mCi of 177Lu-DOTATATE with a goal of delivering 4 infusions, each 2 months apart. After the 1st infusion, patents obtain an In-11 (111In) DOTATATE single photon emission computed tomography (SPECT) scan to verify uptake. After the 2nd infusion, we obtain a CT and/or MRI scan for response assessment. Depending on initial radiographic findings, we either continue with treatment, or reassess with a Fluorine-18 (18F) deoxyglucose or DOTATATE PET scan. Blood samples were collected between each treatment, as well as in the peri-infusion setting.

RESULTS

As of 4/1/2019, 39 patients have been treated at our institution. A total of 27 SPECT/CT scans were obtained after initial infusion or mid-treatment (after 2nd infusion) CT or MRI course of therapy. A total of 17 patients have completed all 4 treatments. 1 patient did not complete the full course of therapy. Of the 17 patients who completed therapy at time of analysis, follow up imaging was available for 16.

CONCLUSION

177Lu-DOTATATE delivery is feasible at a tertiary outpatient medical centers. Acute toxicities, distribution of uptake after infusion, and interval imaging at mid-way through treatment as well as at time of progression/failure will be reviewed. Early analysis of biomarkers and other factors predictive of clinical outcomes will be discussed as well.

CLINICAL RELEVANCE/APPLICATION

As the burden of patients surviving with metastatic tumors increase, the indications for targeted radiopharmaceuticals is expanding. Understanding real-world outcomes for novel radiopharmaceuticals helps refine these therapeutics.

SSJ24-06 Value of Contrast Enhanced Ultrasound with Perfusion Quantitative Analysis during Radiotherapy of Pancreatic Ductal Adenocarcinoma

Tuesday, Dec. 3 3:50PM - 4:00PM Room: S402AB

Participants
Yi Dong, MD, PhD, Shanghai, China (*Presenter*) Nothing to Disclose
Lili Wu, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Qi Zhang, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Daohui Yang, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Yijie Qiu, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Wenping Wang, MD, PhD, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

puguang61@126.com

PURPOSE

To evaluate the value of contrast enhanced ultrasound (CEUS) with perfusion quantitative analysis in monitoring the therapeutic effect of pancreatic ductal adenocarcinoma (PDAC) during radiotherapy.

METHOD AND MATERIALS

From October 2017 to March 2019, 21 patients with histopathologically confirmed local advanced PDAC were included (15 men, 6 women; mean age, 65 years ± 2). All patients treated with chemoradiotherapy (CRT). The radiotherapy dose was 50.4Gy/28Fx with S-1 40mg bid orally taken in radiotherapy day. CEUS were performed before and 4 weeks after CRT. All ultrasound examinations were performed by an ACUSON Oxana 2 ultrasound equipment (Siemens Medical Solutions, USA) with a C6-1 convex array transducer (1-6MHz). Time intensity curves (TICs) were created with SonoLiver (TOMTEC Imaging Systems). Quantitative perfusion indexes were generated and compared inside the PDAC lesion with 5×5 mm region of interest (ROI), including maximum intensity (MI), rise time (RT), mean transit time (MTT) and time to peak (TTP).

RESULTS

While comparing before and after radiotherapy, no significant difference could be found by conventional B mode ultrasound. After created CEUS TIC with perfusion quantitative analysis, significant decrease could be found in MI before and after radiotherapy (41.78 ± 20.15 dB vs 24.79 ± 18.12 dB).

CONCLUSION

Depending on its unique advantages such as non-radiation, effective and convenient, CEUS with perfusion quantitative analysis may be useful to evaluate the therapeutic effect during the radiotherapy of PDAC patients.

CLINICAL RELEVANCE/APPLICATION

CEUS with perfusion quantitative analysis might be a potential imaging method during follow up and observe of the clinical radiotherapy therapeutic effect in PDAC patients.

SSJ26

Vascular/Interventional (Biliary and Portal Hypertension)

Tuesday, Dec. 3 3:00PM - 4:00PM Room: E350

GI IR VA

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

Participants
Mona B. Ranade, MD, Brookfield, WI (*Moderator*) Nothing to Disclose
Seetharam C. Chadalavada, MD,MS, Cincinnati, OH (*Moderator*) Nothing to Disclose

Sub-Events

SSJ26-01 Clinical Effectiveness of Percutaneous Endoscopic Holmium Laser Lithotripsy for Symptomatic Intra/Extrahepatic Biliary Stones

Tuesday, Dec. 3 3:00PM - 3:10PM Room: E350

Participants
Riccardo Muglia, MD, Pieve Emanuele , Italy (*Presenter*) Nothing to Disclose
Dario Poretti, MD, Rozzano, Italy (*Abstract Co-Author*) Nothing to Disclose
Ezio Lanza, MD, Rozzano, Italy (*Abstract Co-Author*) Nothing to Disclose
Francesca Colapietro, Pieve Emanuele , Italy (*Abstract Co-Author*) Nothing to Disclose
Felice D'Antuono, MD, Rocchetta Sant'Antonio, Italy (*Abstract Co-Author*) Nothing to Disclose
Vittorio Pedicini, Napoli, Italy (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To retrospectively assess the efficacy, safety and follow-up of percutaneous endoscopic holmium laser lithotripsy for symptomatic intra/extrahepatic biliary stones.

METHOD AND MATERIALS

We retrospectively evaluated 28 patients (M:F=19:9, median age=68.5 years) with intrahepatic and/or extrahepatic biliary stones, undergoing 43 percutaneous, transhepatic lithotripsies with holmium laser from 2012 to 2018 in a single center.Data collected were: patient characteristics; location and amount of stones; post-procedural symptoms and complications; length of hospital stay; clinical success rate.Endoscopic retrograde cholangiopancreatography was precluded due to bilio-enteric anastomosis in 12/28 (43%) patients, distal gastrectomy in 5/12 (18%), and for prior biliary interventions followed by a fistula, ultimately leading to biliary stenosis in 11/28 (39%).

RESULTS

Twenty patients (71%) received one only lithotripsy, three (11%) underwent two procedures, five (18%) had 3 or more lithotripsies.Multiple interventions were scheduled due to the elevated amount of stones to treat (13/15, 87%) or for new symptomatic biliary stones (2/15, 13%) during follow-up.Stones were localized in intrahepatic ducts (21/43, 49%), extrahepatic ducts (15/43, 33%) or both in intra- and extrahepatic ducts (8/43, 18%).Treatments lasted averagely 115 minutes; we fragmented 1 to 3 stones in 12 treatments (28%) and more than 3 stones in 31 (72%).After lithotripsy, 15 patients (53%) had sepsis with positive hemoculture treated with antibiotics, 2 (7%) had mild intrahepatic bleeding, treated conservatively. Only 1/15 septic patient was admitted in the intensive care unit and discharged after 26 days.Median hospital stay was 5.5 days (range 2-42).Our cohort was followed up for a median time of 17.5 months (0-66) from the first treatment.Twenty-two patients (79%) reached clinical success after lithotripsy, while six (21%) experienced further cholangitis and were readmitted for antibiotic therapy (3/6) or ERCP (3/6).

CONCLUSION

Percutaneous endoscopic holmium laser lithotripsy is effective in treating symptomatic intrahepatic and extrahepatic biliary stones, though burdened by a high incidence of postoperative sepsis.

CLINICAL RELEVANCE/APPLICATION

Percutaneous endoscopic holmium laser lithotripsy could be considered an option for first-line treatment of symptomatic intrahepatic and extrahepatic biliary stones, when ERCP is precluded.

SSJ26-02 Comparison of Percutaneous Endobiliary Radiofrequency Ablation with Stent Placement versus Stent Placement Alone for Treating Malignant Biliary Obstruction: Is There an Added Benefit?

Tuesday, Dec. 3 3:10PM - 3:20PM Room: E350

Participants
Wei Cui, Guangzhou, China (*Presenter*) Nothing to Disclose
Jiaping Li, Guangzhou , China (*Abstract Co-Author*) Nothing to Disclose
Xiaoming Chen, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

weychui@126.com

PURPOSE

To retrospectively compare the outcomes of endobiliary radiofrequency ablation and stent placement (RFA-Stent) with stent placement alone (Stent) in treating unresectable malignant biliary obstruction (MBO).

METHOD AND MATERIALS

The study was approved by the institutional review board, and the requirement to obtain informed consent was waived. Seventy patients (mean age, 61.4 years; 45 men [64.3%]) who underwent RFA-Stent and 63 (mean age, 65.6 years;34 men [54.0%]) who underwent Stent for unresectable MBO from June 2013 to June 2018 were included. Overall survival (OS), primary and secondary stent patency (PSP, SSP), complications were compared according to level of biliary obstruction (subgroup): Type A (distal, Bismuth Types I and II biliary obstruction) and Type B (Bismuth Types III and IV biliary obstruction). Survival curves were calculated by performing the Kaplan-Meier method and compared by using the log-rank test and Cox regression models.

RESULTS

PSP and SSP were significantly longer for the RFA-Stent group than the stent group (PSP: 8.5 months vs. 4.5 months, P < 0.001; SSP: 9.0 months vs. 5.1 months, P < 0.001), but with OS being comparable (6.0 months vs. 4.5 months, P = 0.160). In subgroup analysis, RFA-Stent showed significant OS (8.0 months vs. 5.0 months; P = 0.026) benefits compared to Stent in patients with Type A MBO, but with comparable outcomes in patients with Type B MBO (5.0 months vs. 3.2 months; P = 0.962). The PSP and SSP was improved in both subgroups (Type A, PSP: 8.5 months vs. 4.5 months; P= 0.002; SSP: 9.0 months vs. 5.0 months, P < 0.001; Type B, PSP: 8.0 months vs. 6.0 months, P = 0.045; SSP: 12.0 months vs. 6.0 months, P = 0.005, respectively). The rate of complication was comparable for the RFA-stent group when compared to the stent group (all P > 0.05). In Cox analysis, RFA-Stent modality, performance status score 0, A type of biliary obstruction, total bilirubin<=166.8μmol/L and total bilirubin decrease value after stent placement procedure greater than 21.5μmol/L were favorable prognostic factors for OS. RFA-Stent modality, total bilirubin<= 166.8μmol/L were favorable prognostic factors for PSP. RFA-Stent modality, age older than 65 years, total bilirubin <= 166.8μmol/L were favorable prognostic factors for PSP (all P < 0.05).

CONCLUSION

In this retrospective study, RFA-Stent was associated with improved stent patency in patients with MBO. In addition, RFA-Stent may be associated with improved survival in patients with Type A MBO.

CLINICAL RELEVANCE/APPLICATION

RFA-Stent was associated with improved stent patency in patients with MBO. In addition, RFA-Stent may be associated with improved survival in patients with Type A MBO.

SSJ26-03 Effect of Intra-Gastric Satiety-Inducing Device on Food Intake, Body Weight Gain, and Satiety-Related Hormones in Rat Model

Tuesday, Dec. 3 3:20PM - 3:30PM Room: E350

Participants
Yingen Luo, Beijing, China (*Presenter*) Nothing to Disclose
Jiaywei Tsauo, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
He Zhao, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Jingui Li, Beijing , China (*Abstract Co-Author*) Nothing to Disclose
Xiao Li, PhD, Chengdu, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

againrick@163.com

PURPOSE

To evaluate the effect of an intra-gastric satiety-inducing device (ISD) on food intake, body weight gain, and satiety-related hormones in a rat model.

METHOD AND MATERIALS

The institutional animal care and use committee approved this study. Thirty-two male Sprague Dawley rats weighing 250-300g were randomly divided into four groups of eight each. The ISD (constructed in-house) used was comprised of a 4-mm-diameter 1.5-cm-length straight nitinol stent for the lower esophagus, and one (single-disk) or two (double-disk) 2.5-diameter flat star-shaped nitinol disks for the fundus of stomach. Single-disk and double-disk group rats underwent peroral placement of a single- and double-disk ISD, respectively, and control group rats underwent peroral placement of an ISD with no disk. To prevent migration, the stent part of the ISD was surgically fixed to the esophageal wall using sutures. All operations were performed under direct visualization *via* a laparotomy with fluoroscopy assistance. Sham group rats underwent sham operation. All rats were supplied with food and water ad libitum and were euthanized 4 weeks after the operation.

RESULTS

Technical success was achieved in all rats. One rat in double-disk group died 2 weeks after the operation due to gastric perforation. The remaining rats survived until the end of the study without any complications. The mean food intake over the 4 weeks after the operation was significantly different between the four groups (all $P < .05$). Specifically, the mean food intake was significantly lower in both ISD groups than it was in the control and sham groups (all $P < .05$) but was not significantly different between the single- and double-disk ISD groups ($P > .05$) and the control and sham groups ($P > .05$). The mean body weight gain 4 weeks after the operation was significantly different between the four groups ($P < .05$). Specifically, the mean body weight gain was significantly lower in the double-disk ISD group than it was in the single-disk ISD, control, and sham groups (all $P < .05$), and was significantly lower in the single-disk ISD group than it was in the sham group ($P < .05$), but was not significantly different between the single-disk ISD and control groups ($P > .05$). The mean fasting serum ghrelin and leptin levels 2 and 4 weeks after the operation were not significantly different between the four groups ($P > .05$).

CONCLUSION

ISD could reduce food intake and body weight gain but does not affect satiety-related hormones in a rat model.

CLINICAL RELEVANCE/APPLICATION

ISD might be an effective treatment for obesity which can overcome existing problems. (This is a proof-of-concept animal study.)

SSJ26-04 Non-Invasive Assessment of Portal Hypertension in HBV-Related Liver Cirrhosis with Spectral CT Iodine Density: A Correlation Study with HVPG

Tuesday, Dec. 3 3:30PM - 3:40PM Room: E350

Participants
Jian Dong, PhD, Beijing, China (*Presenter*) Nothing to Disclose
Weimin An, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Jinghui Dong, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Changchun Liu, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

dongjianradiology@163.com

PURPOSE

To investigate the feasibility of spectral CT iodine density in evaluation of portal hypertension by correlation with hepatic venous pressure gradient (HVPG) in patients with liver cirrhosis.

METHOD AND MATERIALS

Thirty-one patients (F/M,13/18, mean age 44.2 ± 7.8 years old) with liver cirrhosis were recruited in this study, and they were all performed three phases contrast enhanced spectral CT within 1 week before TIPS, with HVPG recorded during the interventional surgery. All CT raw data were reconstructed at 1.25 mm slice thickness, and liver and spleen volume were measured in venous phase images. Iodine density (in milligrams per milliliter) were measured on iodine-based material decomposition images. Multiple regions of interest (ROIs) in liver parenchyma, aorta and portal vein were selected from three slices of images with portal vein trunk as the central one, and mean liver parenchymal iodine density from arterial phase, venous phase and delayed phase were recorded. Quantitative indices of iodine density (ID) of liver (IDLAP) and spleen (IDSAP) parenchyma for arterial phase, venous phase (IDLVP) and (IDSVP), ID of portal vein in venous phase (IDPVP) were measured and correlated with HVPG, with statistical significance as $P<0.05$.

RESULTS

For Child-Pugh stage in 31 patients, 12 were grade A, 15 grade B, and 4 grade C. Correlation of quantitative indices with HVPG were as following: (1) no correlation was found between liver and spleen volume, IDLAP, IDSAP, IDSVP and IDLVP with HVPG; (2) IDPVP was found to be independently correlated with the HVPG ($P<0.01$); (3) With threshold set as 54.3, IDPVP demonstrates 69.5% sensitivity, 62.1% specificity, 72.6% positive predictive value and 64.7% negative predictive value in the diagnosis of clinically significant portal hypertension (HVPG >=12mmHg), respectively.

CONCLUSION

Spectral CT Iodine density demonstrates feasibility in evaluation of clinically significant portal hypertension in liver cirrhosis as a noninvasive imaging modality.

CLINICAL RELEVANCE/APPLICATION

It is possible to evaluate clinically significant portal hypertension with quantitative index of iodine density in spectral CT noninvasively.

SSJ26-05 Intravascular Ultrasound (IVUS) Guided Transjugular Intrahepatic Portosystemic Shunts (iTIPS): One-Year Clinical Outcomes

Tuesday, Dec. 3 3:40PM - 3:50PM Room: E350

Participants
Philip A. Velez, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Raja Ramaswamy, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Olaguoke K. Akinwande, MD , Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Seung Kwon Kim, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Christopher D. Malone, MD, St. Louis, MO (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

cmalone@wustl.edu

PURPOSE

Use of intravascular ultrasound (IVUS) to guide portal vein puncture for transjugular intrahepatic portosystemic shunts (iTIPS) has increased in recent years, showing improved procedural metrics such as procedure time, contrast, and radiation doses over conventional techniques. Here we aim to evaluate the one-year clinical outcomes of patients undergoing iTIPS placement at our institution.

METHOD AND MATERIALS

All patients having undergone iTIPS placement between January 2016-March 2018 with 1-year clinical follow up were retrospectively analyzed. Medical records were reviewed for TIPS indication, clinical and demographic data, procedural details, clinical outcomes, and need for TIPS revisions. Clinical success was defined as requiring a decrease need or discontinuation of paracentesis/thoracentesis or absence of variceal bleeding for those respective primary indications. Technical success, 30-day complication rate, and need for TIPS revisions through one year post procedure were evaluated.

RESULTS

A total of 43 patients underwent iTIPS for refractory ascites (58%), control or secondary prevention of variceal bleeding (38%), or other (4%) with median Na-MELD of 14 (range 7-25). Technical success rate was 98%, with only one procedure having been aborted due to unfavorable anatomy and presence of portal vein thrombus, and was successfully reattempted with IVUS 1 month later. Complications within 30 days were only seen in 2 patients (4.7%) consisting of acute respiratory failure and heart failure decompensation. There were no bleeding complications. The clinical success rate at one year was 88.4%. 13 patients (30%) underwent revision(s) within one year. However, of these revisions only 4 (9%) had clinical evidence of TIPS malfunction (3 with reaccumulated ascites burden and 1 with variceal rebleed).

CONCLUSION

Use of IVUS for TIPS placement is highly technical successful with low 30-day complication rates and provides durable 1 year efficacy in controlling ascites and variceal bleeding. While the revision rate over 1 year was 30%, only a minority of these manifested with clinical signs of TIPS malfunction.

CLINICAL RELEVANCE/APPLICATION

iTIPS not only provides improved procedural metrics as previously reported, but shows durable 1-year clinical success, acceptable revision rates, and low 30-day complications.

SSJ26-06 Creation of a Haptic 3D Printed Simulator for TIPS Training in Augmented and Virtual Reality

Tuesday, Dec. 3 3:50PM - 4:00PM Room: E350

Participants
Tyler A. Smith, MD, Salt Lake City, UT (*Presenter*) Nothing to Disclose
Adriene Eastaway, MD, Sandy, UT (*Abstract Co-Author*) Nothing to Disclose
Gabriel C. Fine, MD, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose
Abigail R. Cogman, DO, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose
Michael D. Weintraub, MD, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose
Claire Kaufman, MD, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose
Keith B. Quencer, MD, Salt Lake City, UT (*Abstract Co-Author*) Research support, Cook Group Incorporated
Brendan Crabb, BS, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose
Edward P. Quigley III, MD,PhD, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

TIPS creates artificial channel within the cirrhotic liver from inflow portal vein to outflow hepatic vein. TIPS morbidity and mortality is high due to patient risk factors and complex anatomy.

METHOD AND MATERIALS

Our developments in 3D printing biomimetic haptic simulators coregisters patient specific anatomy to produce a realistic VR/AR environment. Patient CTA images (Siemens, Germany) are converted to 3D objects using Mimics (Materialis, Belgium). Individual models of liver, portal, hepatic, caval veins, arteries, and bones were used to create multicolor virtual models of operative field. Each model components are individually 3D printed. Osseous structures are printed using fused deposition modeling on Fusion 3D and Ultimaker 3 printers, using polylactic acid (PLA). Hollow vessels were made in Formlabs elastic resin and connected to 3D printed manifolds and pumps. Liver is molded into 3D printed reusable liver mold. VR model, patient CT abdomen images are coregistered and overlaid upon haptic simulator using the Novarad Opensight software (Novarad Corporation, South American Fork, UT) and Microsoft HoloLens augmented reality platform (Microsoft Corporation, Redmond, WA.

RESULTS

Trainees in AR/VR/MR environment can see virtual model while doing TIPS on realistic 3D-printed haptic model. Prior to patient procedure, they can practice critical skills: TIPS creation, stent deployment, TIPS remodeling.

CONCLUSION

Virtual reality/augmented reality (VR/AR) is a critical training tool for patient-specific image-guided procedures such as TIPS. Training VR/AR simulation environments prior to performing TIPS enhances user confidence, decrease complications, procedural time, and radiation exposure. We demonstrate an ideal TIPS teaching model utilizing 3D printed haptic simulator, the Microsoft HoloLens, and the co-registered haptic/virtual simulator using the Novarad Opensight Software.

CLINICAL RELEVANCE/APPLICATION

To create 3D printed patient specific transjugular intrahepatic portosystemic shunt (TIPS) simulators fused with virtual reality (VR) and augmented reality (AR) to improve trainee performance, decrease procedure time, radiation dose, and clinical morbidity and mortality.

VSIO32

Interventional Oncology Series: Colorectal Liver Metastases

Tuesday, Dec. 3 3:15PM - 5:15PM Room: S405AB

GI IR OI RO

AMA PRA Category 1 Credits ™: 2.00
ARRT Category A+ Credits: 2.25

FDA Discussions may include off-label uses.

Participants
Constantinos T. Sofocleous, MD, PhD, New York, NY (*Moderator*) Consultant, General Electric Company; Consultant, Johnson & Johnson; Consultant, Terumo Corporation; Research support, BTG International Ltd; Research support, Johnson & Johnson; ; ; Sarah B. White, MD, Milwaukee, WI (*Moderator*) Research support, Guerbet SA; Research support, Siemens AG; Research support, Instylla; Research support, InSightec Ltd; Consultant, Guerbet SA; Consultant, BTG International Ltd; Consultant, Cook Group Incorporated; Consultant, Strategies MD

Sub-Events

VSIO32-01 Immunotherapy in the Treatment of CRC: Synergy with Interventional Oncology

Tuesday, Dec. 3 3:15PM - 3:30PM Room: S405AB

Participants
Ursina Teitelbaum, Philadelphia, PA (*Presenter*) Nothing to Disclose

VSIO32-02 Is a Cure Possible in Patients Undergoing Liver Resection with mCRC?

Tuesday, Dec. 3 3:30PM - 3:45PM Room: S405AB

Participants
Michael D'Angelica, MD, New York, NY (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Be able to define the rate of cure after complete resection of cure after resection of colorectal liver metastases. 2) Be able to discuss the factors associated with differences in rate of cure. 3) Be able to discuss the role of surgery in the treatment of colorectal liver metastases.

VSIO32-03 Rad Onc: Is XRT a Good Alternative to Ablation? Any Data Specifically for CLM?

Tuesday, Dec. 3 3:45PM - 4:00PM Room: S405AB

Participants
Karyn A. Goodman, MD, Aurora, CO (*Presenter*) Scientific Advisory Board, RenovoRx

For information about this presentation, contact:

karynaalamigoodman@gmail.com

LEARNING OBJECTIVES

1) Appreciate the clinical outcomes of SBRT for metastatic liver disease, in particular colorectal liver metastases. 2) Understand the selection criteria for SBRT for liver metastases 3) Compare the appropriateness and outcomes of SBRT versus ablation for liver metastases in various treatment scenarios. 4) Assess the potential for combining SBRT with other liver-directed therapies.

VSIO32-04 Increases in Cell Proliferation and Angiogenesis Markers in Untreated Tumors Following Radiofrequency Ablation of Liver Tumors

Tuesday, Dec. 3 4:00PM - 4:10PM Room: S405AB

Participants
Matthias M. Stechele, MD, Munich, Germany (*Presenter*) Nothing to Disclose
Jens Ricke, MD,PhD, Berlin, Germany (*Abstract Co-Author*) Research Grant, Sirtex Medical Ltd Research Grant, Bayer AG
Haixing Liao, PhD, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose
MacIej Powerski, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Aurelia Markezana, MSc, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose
Nahum Goldberg, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

matthias.stechele@med.uni-muenchen.de

PURPOSE

To elucidate potential systemic off-target effects of radiofrequency ablation (RFA) in distant non-treated hepatocellular carcinoma

(HCC) and liver metastases of colorectal cancer.

METHOD AND MATERIALS

A prospective, national multicenter single-arm trial (THIAMAT) was performed on 9 patients undergoing 2 treatment sessions scheduled 2 weeks apart to treat multiple histologically confirmed HCC (n=3) or oligometastatic colorectal cancer (n=6) with RFA. In each session, core biopsy of a target tumor was obtained using coaxial technique prior to the RFA. This enabled comparison of the potential effects of the first treatment upon remote, non-ablated tumors. Samples were stained with immunohistochemistry of Ki-67 and CD34 to measure proliferation index and microvascular density, respectively. At least 5 high power fields for each patient and each staining were obtained and evaluated for positive stained cells by 3 blinded experienced readers. Pre- and post-treatment data were compared with 2-tailed Student t test.

RESULTS

Of 7 patients with diagnostic quality material on both biopsies, 4 (57.1%) demonstrated a statistically significant increase in one or both markers. CD34 was increased in 3 of 7 patients (42.8 %), (2x, 2x and 3x fold increases, all $p<0.01$). Ki-67 was statistically significant increased in 2 patients (5.1±3.0 to 18.6±12.9 and 2.6±1.3 to 15.4±3.6; $p<0.01$, both comparisons), with 1 patient having significant increases in both markers. An additional patient had several clusters of increased Ki-67 positive staining compared to baseline, which did not reach significance using parametric statistical testing ($p=0.15$).

CONCLUSION

RFA of liver tumors can induce increased proliferation and promote angiogenesis in distant non-treated tumors. These preliminary data provide further evidence of potentially systemic off-target effects put into motion by interventional oncologic treatment in the clinical setting. Further ongoing data collection may provide better understanding of underlying mechanisms and thus offer valuable insights into potential options for new diagnostic and therapeutic approaches to improve patient care by mitigating this unwanted phenomenon.

CLINICAL RELEVANCE/APPLICATION

Insights on mechanisms of potential off-target effects of minimally invase treatment may lead to development of combination therapies that can potentiate the effect of these procedures and thus provide better patient care.

VSIO32-05 IR: Role of Ablation in the Treatment of mCRC-Could It Ever Replace Resection?

Tuesday, Dec. 3 4:10PM - 4:25PM Room: S405AB

Participants
Constantinos T. Sofocleous, MD, PhD, New York, NY (*Presenter*) Consultant, General Electric Company; Consultant, Johnson & Johnson; Consultant, Terumo Corporation; Research support, BTG International Ltd; Research support, Johnson & Johnson; ; ;

VSIO32-06 IR: Role for IAT in mCRC-What is the Evidence for Abscopal Effects?

Tuesday, Dec. 3 4:25PM - 4:40PM Room: S405AB

Participants
Riad Salem, MD, MBA, Chicago, IL (*Presenter*) Research Consultant, BTG International Ltd Research Grant, BTG International Ltd Consultant, Eisai Co, Ltd Consultant, Exelixis, Inc Consultant, Bristol-Myers Squibb Company Consultant, Dove

LEARNING OBJECTIVES

1) Learn about intra arterial therapies. 2) Discuss long-term outcomes and compare to surgical treatments.

ABSTRACT

VSIO32-07 Radioembolization-Induced Chronic Hepatotoxicity: A Multi-Center Study

Tuesday, Dec. 3 4:40PM - 4:50PM Room: S405AB

Participants
Brian M. Currie, MD , Philadelphia, PA (*Presenter*) Nothing to Disclose
Daniel B. Brown, MD, Nashville, TN (*Abstract Co-Author*) Research Support, Sirtex Medical Ltd Consultant, C. R. Bard, Inc Consultant, BTG International Ltd
Nicholas Fidelman, MD, San Francisco, CA (*Abstract Co-Author*) Research Grant, BTG International Ltd
Steven C. Rose, MD, San Diego, CA (*Abstract Co-Author*) 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 Consultant, Guerbet SA Consultant, XLSciTech, Inc
Sarah B. White, MD, Milwaukee, WI (*Abstract Co-Author*) Research support, Guerbet SA; Research support, Siemens AG; Research support, Instylla; Research support, InSightec Ltd; Consultant, Guerbet SA; Consultant, BTG International Ltd; Consultant, Cook Group Incorporated; Consultant, Strategies MD
Ghassan El-Haddad, MD, Tampa, FL (*Abstract Co-Author*) Advisory Board, Actinium Pharmaceuticals, Inc; Advisory Board, Oncoinvent, AS; Research Consultant, Canon Medical Systems Corporation; Speaker, Novartis AG;
Sharon W. Kwan, MD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Etay Ziv, MD,PhD, New York, NY (*Abstract Co-Author*) Research Grant, Johnson & Johnson;
Nahyun Jo, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Rony Avritscher, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Matthew S. Johnson, MD, Indianapolis, IN (*Abstract Co-Author*) Research Consultant, Bayer AG Research Consultant, Bristol-Myers Squibb Company Research Consultant, Boston Scientific Corporation Research Consultant, Cook Group Incorporated Research Consultant, BTG International Ltd Research support, BTG International Ltd Research Consultant, Surefire Medical, Inc Research support, Surefire Medical, Inc Research Consultant, Johnson & Johnson Research Consultant, Avantec
Michael C. Soulen, MD, Lafayette Hill, PA (*Abstract Co-Author*) Consultant, F. Hoffmann-La Roche Ltd; Consultant, Guerbet SA; Research support, Guerbet SA; Research support, BTG International Ltd; Proctor, Sirtex Medical Ltd;

For information about this presentation, contact:

brian.currie@pennmedicine.upenn.edu

PURPOSE

The acute and subacute hepatic sequelae of trans-arterial radioembolization (TARE) are relatively well-characterized, but there is a paucity of literature evaluating delayed hepatotoxicity. Previous single-institution studies have been limited by the use of qualitative criteria for liver dysfunction and lack of rigorous attribution of toxicities. The objective of this multicenter study was to identify and describe TARE-related chronic hepatoxicity using standardized quantifiable metrics and multidisciplinary adjudication.

METHOD AND MATERIALS

IRB-approved multi-center retrospective analysis of all neuroendocrine tumor patients from 10 institutions receiving TARE from 2005-2018 and surviving at least one year from the initial TARE (n=166). Patients were evaluated for the presence or absence of Grade 3 or above hepatic toxicities occurring at least 6 months after TARE. The mean age of patients was 56 with a slight male predominance at 52%. Adjudication of hepatic decompensation was performed by a multidisciplinary panel from each institution comprised among hepatology, radiation oncology, medical oncology, and interventional oncology.

RESULTS

There were 57 patients (34%) who developed chronic Grade 3 and above hepatic toxicities with a total of 68 Grade 3 and 26 Grade 4 events, with ascites being the most common. There are least five deaths attributed to hepatic decompensation (3%), without evidence of underlying disease progression or another more plausible precipitant. Patients developing toxicities were more frequently treated with prior locoregional therapy 32% vs. 21% ($p = 0.18$) but received less cumulative activity, 67 vs. 78 mCi ($p = 0.18$). There was no difference in the number or treatments received (1.7 vs. 1.9) or the number of patients with intrahepatic tumor volume greater than 50% (29% vs. 28%).

CONCLUSION

Delayed hepatic toxicity occurred in 34% of patients following radioembolization with five fatalities adjudicated to be a result of the treatment. Patients treated with prior locoregional therapies may be predisposed to developing chronic toxicity.

CLINICAL RELEVANCE/APPLICATION

Chronic liver injury stemming from radioembolization remains an incompletely characterized phenomenon that leads to substantial morbidity and mortality. Fully elucidating this process would significantly impact patient care.

VSIO32-08 **Tumor Board**

Tuesday, Dec. 3 4:50PM - 5:15PM Room: S405AB

MSRO39

BOOST: Gastrointestinal- Anorectal Cancer eContouring

Tuesday, Dec. 3 4:30PM - 5:30PM Room: S104B

GI OI RO

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

Participants
Edward Y. Kim, MD, Seattle, WA (*Presenter*) Nothing to Disclose
Spencer C. Behr, MD, San Francisco, CA (*Presenter*) Research Grant, General Electric Company; Consultant, Navidea Biopharmaceuticals, Inc; Grant, Navidea Biopharmaceuticals, Inc
Ryan O'Malley, MD, Seattle, WA (*Presenter*) Research Grant, General Electric Company

For information about this presentation, contact:

spencer.behr@ucsf.edu

edykim@uw.edu

Special Information

The e-contouring sessions may be used by participating radiation oncologists to fulfill a PQI (practice quality improvement) requirement for ABR (American Board of Radiology) MOC (Maintenance of Certification). Interested radiation oncologist can download a e-contouring PQI template here: https://academy.astro.org/content/econtouring-pqi-template and handouts directing users to the same website will be available at the actual session.

LEARNING OBJECTIVES

1) Develop familiarity with anatomic considerations relevant to radiotherapy planning for rectal cancer. 2) Apply information from diagnostic imaging studies to radiotherapy planning for rectal cancers.

ABSTRACT

Participants in this session will gain familiarity with anatomic considerations relevant to target contour definition for radiation treatment planning for rectal cancer. Expertise will be provided by diagnostic imaging and radiation oncology presenters.

RC409

Challenging Abdominal Imaging Cases (Interactive Session)

Tuesday, Dec. 3 4:30PM - 6:00PM Room: E353C

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Special Information

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC409A Challenging Cases: Pancreas/Biliary

Participants
Jorge A. Soto, MD, Boston, MA (*Presenter*) Royalties, Reed Elsevier

LEARNING OBJECTIVES

1) Develop an algorithm for evaluating biliary and pancreatic abnormalities through evaluation of challenging cases. 2) Highlight key imaging features that are useful to narrow the differential diagnosis. 3) Increase confidence in the interpretation of complex MR cholangiopancreatography examinations.

RC409B Challenging Cases: CT Colonography

Participants
Courtney C. Moreno, MD, Suwanee, GA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Assess reasons for missing or overcalling polyps on CT colonography examinations. 2) Describe how to avoid pitfalls when interpreting CT colonography examinations. 3) Apply technical advances to improve CT colonography examination quality.

RC409C Challenging Cases: Liver

Participants
Aarti Sekhar, MD, Atlanta, GA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

aarti.sekhar@gmail.com

LEARNING OBJECTIVES

1) Review challenging liver cases in these categories: perfusional anomalies versus hypervascular lesions; atypical hemangiomas versus malignancy; cyst vs mucinous neoplasm; and FNH versus adenoma. 2) Review areas for improvement in reporting liver cases for pre-surgical planning, with the goal of learning how to 'think like a surgeon'; these topics will be covered: pertinent vascular and biliary anomalies, calculating liver volumes, and staging/reporting of colorectal liver metastases and hilar cholangiocarcinoma.

RC409D Challenging Cases: Rectal MR

Participants
Kartik S. Jhaveri, MD, Mississauga, ON (*Presenter*) Research Grant, General Electric Company; Research Grant, Bayer AG; Speaker, Siemens AG; Speaker, Bayer AG

LEARNING OBJECTIVES

1) Review rectal cancer MRI cases with implications for management. 2) Highlight potential pitfalls in MRI reporting. 3) Showcase uncommon presentations and mimics.

ED005-WE

Gastrointestinal Wednesday Case of the Day

Wednesday, Dec. 4 7:00AM - 11:59PM Room: Case of Day, Learning Center

AMA PRA Category 1 Credit ™: .50

Participants

Anup S. Shetty, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Cameron Adler, MD, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose
Stephanie T. Chang, MD, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose
Amy K. Hara, MD, Scottsdale, AZ (*Abstract Co-Author*) Nothing to Disclose
Maria Zulfiqar, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Joseph R. Grajo, MD, Gainesville, FL (*Abstract Co-Author*) Nothing to Disclose
Laura L. Magnelli, MD, Gainesville, FL (*Abstract Co-Author*) Nothing to Disclose
Joseph W. Owen, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Michael Nisiewicz, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Andres R. Ayoob, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
James T. Lee, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Rex A. Parker III, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Emilie T. Nguyen, MD, Playa Vista, CA (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Each GI case of the day will be taken from disorders of the luminal GI tract as well as the liver, spleen, pancreas, and biliary system. The findings may be uncommon manifestations of common diseases or common manifestations of uncommon diseases.

SPDL40

Body Imaging Case Challenge (Case-based Competition)

Wednesday, Dec. 4 7:15AM - 8:15AM Room: E451B

CH GI GU

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 0

Participants
Sayf A. Al-Katib, MD, Royal Oak, MI (*Presenter*) Nothing to Disclose
Monisha Shetty, MD, Royal Oak, MI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

monisha.shetty@beaumont.edu

Sayf.Al-Katib@beaumont.edu

Special Information

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

LEARNING OBJECTIVES

1) Engage in a friendly, fast-paced, interactive body imaging unknown case competition. 2) Review presentation and imaging pearls of uncommon diagnoses of the chest, abdomen and pelvis. 3) Monitor individual and team performance in real-time by answering a spectrum of questions types using the RSNA Diagnosis Live platform. 4) Analyze personal results of the competition by way of a self-assessment report sent via email.

SPSC40

Controversy Session: Incidental Pancreatic Cyst Management

Wednesday, Dec. 4 7:15AM - 8:15AM Room: E350

GI

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

Participants
Desiree E. Morgan, MD, Birmingham, AL (*Moderator*) Institutional Research Grant, General Electric Company; Consultant, General Electric Company
William W. Mayo-Smith, MD, Boston, MA (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

dmorgan@uabmc.edu

LEARNING OBJECTIVES

1) Understand the variability among expert published recommendations for follow up of incidentally discovered pancreatic cysts. 2) Develop basic knowledge of potential cyst malignant transformation. 3) Summarize the ACR incidental pancreatic cyst management algorithm and apply recommendations for cyst follow up relevant to clinical practice.

Sub-Events

SPSC40A Incidental Pancreatic Cyst Risks: The Facts

Participants
Koenraad J. Mortele, MD, Boston, MA (*Presenter*) Nothing to Disclose

SPSC40B Pancreatic Cyst Management Algorithms: The Mess

Participants
Atif Zaheer, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the natural history of Intraductal papillary mucinous neoplasms (IPMNs). 2) Understand the importance of surveillance and intervention of the cystic lesions of the pancreas due to their malignant potential. 3) Discuss different management algorithms and how they relate to the natural history of the disease.

ABSTRACT

Cystic lesions of the pancreas are a common finding on routine imaging and due to the pre-cancerous nature of some of these lesions, there is a dire need of standard guidelines for surveillance. There are multiple surveillance algorithms suggested by different groups such as the American College of Gastroenterology, Fukuoka guidelines etc. that vary with their level of aggressiveness for intervention. The goal is to discuss management algorithms as they relate to the natural history of the pre-cancerous cystic lesions (IPMNs) of the pancreas.

SPSC40C ACR Pancreatic Cyst Guidelines: The Summary

Participants
Desiree E. Morgan, MD, Birmingham, AL (*Presenter*) Institutional Research Grant, General Electric Company; Consultant, General Electric Company

LEARNING OBJECTIVES

1) Understand the patterns of recommendations, based on level of potential risk for biologically significance, in the ACR white paper on incidental pancreatic cysts. 2) Know which imaging features described in the ACR recommendations are associated with increased risk for malignancy during surveillance for incidentally detected pancreatic cysts.

SPSC40D Should ACR Guidelines Be Followed-YES

Participants
Elizabeth M. Hecht, MD, New York, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ehecht@columbia.edu

LEARNING OBJECTIVES

1) Debate the pros and cons of applying the ACR guidelines in clinical practice.

ABSTRACT

While the risk of malignancy is low for small incidentally discovered asymptomatic pancreatic cysts, no one wants to miss a cancer.

Yet, surveillance can be costly for patients and the healthcare system. The ACR management guidelines published in 2017 provided algorithms intended to help the radiologist and care providers but there are competing guidelines.

SPSC40E Should ACR Guidelines Be Followed-NO

Participants
David M. Hough, MD, Rochester, MN (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

Debate the pros and cons of applying ACR guidelines in clinical practice

ABSTRACT

It is beneficial to have practice guidelines to improve quality and uniformity in management of incidental pancreatic cysts. However there are competing guidelines, and compelling reasons why the ACR recommendations may not be appropriate to your practice.

SPSC40F Q&A

Printed on: 10/29/20

MSCP41

Case-based Review of Pediatric Radiology (Interactive Session)

Wednesday, Dec. 4 8:30AM - 10:00AM Room: E450B

GI GU NR PD VA

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Edward Y. Lee, MD, Boston, MA (*Director*) Nothing to Disclose

LEARNING OBJECTIVES

1) Review clinical presentations of congenital and acquired pediatric disorders. 2) Discuss optimal imaging techniques for assessing various pediatric disorders. 3) Learn characteristic imaging findings of congenital and acquired pediatric disorders.

Sub-Events

MSCP41A Pediatric Brain Disorders

Participants
Noor A. Al Khori, MD, Doha, Qatar (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

nalkhori@sidra.org

LEARNING OBJECTIVES

1) Review imaging features of a few disorders. 2) Review relevant clinical features, pathophys, and associations. 3) Review the role of various imaging modalities in diagnosis and management.

MSCP41B Pediatric Vascular Disorders

Participants
Jared R. Green, MD, Chicago, IL (*Presenter*) Nothing to Disclose

ABSTRACT

During this interactive session, vascular anomalies cases will be presented allowing the learners to recognize the imaging findings and to understand the importance of performing US and MR for diagnosis. Key points will be discussed to avoid misdiagnosis.

MSCP41C Pediatric Abdominal Disorders

Participants
Grace S. Phillips, MD, Seattle, WA (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To describe the imaging appearance of various pediatric abdominal tumors and tumor-like conditions. 2) To discuss an appropriate imaging algorithm for pediatric abdominal masses. 3) To highlight specific imaging and patient characteristics that help to narrow the differential diagnosis.

ABSTRACT

During this interactive session, pediatric abdominal disorder cases will be presented allowing the learners to recognize and describe the imaging features of various diagnostic entities. Key points will be discussed to avoid misdiagnosis.

MSCP41D Pediatric Pelvic Disorders

Participants
Domen Plut, MD, Ljubljana, Slovenia (*Presenter*) Nothing to Disclose

ABSTRACT

During this case-driven, interactive session, pediatric pelvic disorders will be presented allowing the participants to recognize and describe the imaging features of various diagnostic entities.

MSES41

Essentials of GI Imaging

Wednesday, Dec. 4 8:30AM - 10:00AM Room: S100AB

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

MSES41A Acute Left Lower Quadrant Pain

Participants
Jennifer W. Uyeda, MD, Boston, MA (*Presenter*) Consultant, Allena Pharmaceuticals, Inc

MSES41B Biliary Interventions

Participants
Paula Novelli, MD, Pittsburgh, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

novellipm2@upmc.edu

LEARNING OBJECTIVES

1) Describe imaging workup and diagnostic strategies for evaluating bile duct pathology including benign and malignant strictures, iatrogenic bile duct injury, biliary complications of liver transplant, stone disease. 2) Apply the essentials of periprocedural care including sedation and analgesia. 3) Understand techniques for accessing the biliary tree and strategies for percutaneous management of bile duct pathology. 4) Know how to manage complications of percutaneous biliary intervention.

MSES41C Congenital Abnormalities of Biliary Tree

Participants
Giuseppe Brancatelli, MD, Palermo, Italy (*Presenter*) Speaker, Bayer AG; Travel support, Bracco Group

For information about this presentation, contact:

gbranca@yahoo.com

LEARNING OBJECTIVES

1) To review the etiology of congenital abnormalities of the biliary tree. 2) To describe the characteristic radiological features with pathologic correlation. 3) To discuss the advantages and limitations of current imaging techniques for the differential diagnosis of these conditions.

MSES41D Imaging Diagnosis and Staging of Cholangiocarcinoma

Participants
Celso Matos, MD, Lisbon, Portugal (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

celso.matos@fundacaochampalimaud.pt

LEARNING OBJECTIVES

1) Describe imaging workup and diagnostic strategies for evaluating cholangiocarcinoma. 2) Recognize imaging patterns of mass-forming, periductal-infiltrating and intraductal-growing cholangiocarcinoma. 3) Discuss differential diagnosis.

ABSTRACT

Cholangiocarcinoma is a primary malignant tumor originating from the bile duct epithelium with a broad spectrum of imaging patterns and clinical manifestations.CT and MRI are the most commonly used imaging modalities. They are used alone or in combination with endoscopy techniques to detect, characterize, stage,and assess resectability. In this lecture an overview of the different imaging patterns allowing to achieve those aims will be presented and discussed.

RC509

Useful Applications of Gastrointestinal Tract Imaging

Wednesday, Dec. 4 8:30AM - 10:00AM Room: S402AB

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC509A Esophageal Imaging: GERD and Beyond

Participants
David J. Disantis, MD, Jacksonville, FL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

djdisantis@gmail.com

LEARNING OBJECTIVES

1) Perform a dual phase esophagram. 2) Recognize the types of pathology that can be diagnosed with esophagography.

ABSTRACT

Swallowing studies and esophagrams remain the most frequently performed gastrointestinal fluoroscopic studies. This presentation offers a step-by-step guide for performing a high quality dual phase esophagram, with examples of the types of pathology that can be detected using these techniques.

RC509B Imaging Following Bariatric Procedures

Participants
Laura R. Carucci, MD, Midlothian, VA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

laura.carucci@vcuhealth.org

LEARNING OBJECTIVES

1) Recognize the expected postoperative radiologic appearance following commonly performed bariatric surgical procedures for morbid obesity, in particular the Roux-en-Y gastric bypass, gastric band and gastric sleeve. 2) Describe and recognize common complications and potential pitfalls on imaging studies following these bariatric procedures.

RC509C State-of-the-Art MR Enterography

Participants
Seong Ho Park, MD, Seoul, Korea, Republic Of (*Presenter*) Research Grant, Central Medical Service Co, Ltd

For information about this presentation, contact:

parksh.radiology@gmail.com

LEARNING OBJECTIVES

1) Explain how to obtain MR enterography images with adequate quality. 2) Describe MR enterography findings in Crohn's patients according to current interpretive guidelines.

RC509D Optimizing Your CT Colonography Service

Participants
Judy Yee, MD, Bronx, NY (*Presenter*) Research Grant, EchoPixel, Inc; Research Grant, Koninklijke Philips NV; Research Grant, General Electric Company

For information about this presentation, contact:

jyee@montefiore.org

LEARNING OBJECTIVES

1) Compare CT colonography to other colorectal cancer screening tests. 2) Understand the latest techniques for performing low radiation dose CT colonography. 3) Identify methods for time-efficient interpretation. 4) Describe the current status of CT colonography for colorectal cancer screening and diagnosis.

RC517

Emerging Technology: Dual-energy and Spectral CT Update 2019

Wednesday, Dec. 4 8:30AM - 10:00AM Room: S505AB

CH CT GI MK NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Savvas Nicolaou, MD, Vancouver, BC (*Moderator*) Institutional research agreement, Siemens AG; Stockholder, Canada Diagnostic Centres

For information about this presentation, contact:

savvas.nicolaou@vch.ca

LEARNING OBJECTIVES

1) Briefly review the principles of Dual Energy CT/Spectral imaging. 2) Review virtual non-contrast imaging, iodine mapping, 3 material decomposition, and monoenergetic imaging. 3) Review cases demonstrating abdominal organ perfusion and oncologic applications in the abdomen. 4) To outline novel applications of dual energy CT in assessing bone marrow edema, gout, ligament/tendon analysis and metal artifact reduction. 5) To outline novel techniques using Dual Energy CT in pulmonary embolism, cardiac ischemia assessment. 6) Review DECT/spectral imaging applications in the brain.

Sub-Events

RC517A How to Successfully Implement a Dual-energy CT in Your Practice?

Participants
Nicolas Murray, MD, Vancouver, BC (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) To learn the tips and tricks to make a dual-energy CT implementation successful. 2) To recognize the potential barriers in implementation of dual-energy CT in your practice.

RC517B Practical Multi-energy Applications of the Cardiothoracic System

Participants
Prabhakar Rajiah, MD, FRCR, Dallas, TX (*Presenter*) Royalties, Reed Elsevier

LEARNING OBJECTIVES

1) To describe the different implementations of multi-energy CT technology. 2) To discuss the updates on the utility of multi-energy CT in cardiothoracic imaging. 3) To review the applications of multi-energy CT in cardiothoracic imaging.

RC517C Novel and Emerging Neuroradiology Multi-energy Applications

Participants
Aaron D. Sodickson, MD,PhD, Boston, MA (*Presenter*) Institutional research agreement, Siemens AG; Speaker, Siemens AG; Speaker, General Electric Company

For information about this presentation, contact:

asodickson@bwh.harvard.edu

LEARNING OBJECTIVES

1) Review Dual Energy CT fundamentals and post-processing applications. 2) Demonstrate the utility of Dual Energy CT to add value in neuro imaging, including pathology detection, lesion characterization, diagnostic confidence, and reduced length-of-stay.

RC517D Dual-energy/Spectral CT of the Abdomen: Making a Difference

Participants
Desiree E. Morgan, MD, Birmingham, AL (*Presenter*) Institutional Research Grant, General Electric Company; Consultant, General Electric Company

LEARNING OBJECTIVES

1) Apply strategies of dual energy CT for streamlined characterization of incidentally detected intra-abdominal abnormalities such as hepatic steatosis, adrenal adenomas, and renal lesions. 2) Develop and utilize post processing techniques that improve detection and identification of clinically relevant imaging features of abdominal tumors. 3) Understand limitations and compare workflow differences among major dual/multienergy scanning systems for abdominal applications.

RC517E Practical and New Clinical Applications in Musculoskeletal Dual Energy/Spectral CT: Case Based

Participants
Fabio Becce, MD, Lausanne, Switzerland (*Presenter*) Research Consultant, Horizon Pharma USA, Inc; Confidentiality Agreement, MARS Bioimaging Ltd

LEARNING OBJECTIVES

1) Comprehend the basic principles and technical aspects of dual- and multi-energy CT when imaging the musculoskeletal system. 2) Apply dual-energy CT when assessing various musculoskeletal disorders, from crystal-related arthropathies to bone marrow edema. 3) Identify potential new applications of dual-energy CT in musculoskeletal imaging, such as CT arthrography and iron-related disorders.

Printed on: 10/29/20

RC520

MR Image Guidance Radiotherapy

Wednesday, Dec. 4 8:30AM - 10:00AM Room: E353A

GI GU MR RO

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Kathryn J. Fowler, MD, San Diego, CA (*Moderator*) Consultant, 12 Sigma Technologies; Researcher, Nuance Communications, Inc; Contractor, Midamerica Transplant Services; ;

For information about this presentation, contact:

k1fowler@ucsd.edu

LEARNING OBJECTIVES

1) Review MR imaging staging for gynecological cancers. 2) Discuss acquisition parameters and recommended sequences for evaluation. 3) Evaluate techniques for evaluating treatment response. 4) Emerging techniques. 5) Recognize the role of MR guided SBRT for borderline resectable and locally advanced pancreas tumors. 6) Recognize the role of MR guided SBRT for intra-abdominal oligometastatic tumors. 7) Identify adaptive workflow strategies to increase physician utilization and clinic efficiency. 8) Identify why MRI-guided radiation therapy has the potential to improve treatment outcomes in the management of pelvic malignancies. 9) Differentiate between rules for safe dose escalation during non-adaptive stereotactic body radiation therapy (SBRT) versus adaptive MRI-guided SBRT. 10) Develop an MRI-guided adaptive treatment flow for the management of cervical cancer. 11) recognize the unique challenges of implementing MRI-guided radiation therapy workflows. 12) develop procedures for safe and efficient delivery of online adaptive radiation therapy. 13) understand the common sources of dosimetric errors in MRI-guided radiation therapy.

Sub-Events

RC520A MR Imaging Requirements for Gastrointestinal/Gynecological Tumors

Participants
Rebecca Rakow-Penner, MD, PhD, San Diego, CA (*Presenter*) Research Grant, General Electric Company

For information about this presentation, contact:

rrakowpenner@ucsd.edu

LEARNING OBJECTIVES

1) Review MR imaging staging for gynecological cancers. 2) Discuss acquisition parameters and recommended sequences for evaluation. 3) Evaluate techniques for evaluating treatment response. 4) Emerging techniques.

RC520B Role of MR-guided RT for Abdominal Tumors

Participants
Hyun Kim, MD, Saint Louis, MO (*Presenter*) Research Grant and Speakers Bureau, Varian Medical Systems, Inc; Research Grant and Speakers Bureau, ViewRay, Inc

For information about this presentation, contact:

kim.hyun@wustl.edu

LEARNING OBJECTIVES

1) Recognize the role of MR guided SBRT for borderline resectable and locally advanced pancreas tumors. 2) Recognize the role of MR guided SBRT for intra-abdominal oligometastatic tumors. 3) Identify adaptive workflow strategies to increase physician utilization and clinic efficiency.

RC520C Role of MR-guided RT for Pelvic Tumors

Participants
Lorraine Portelance, MD, Miami, FL (*Presenter*) Advisory Committee, Sirtex Medical Ltd; Advisory Board, BTG International Ltd; Moderator, ViewRay, Inc

For information about this presentation, contact:

lportelance@med.miami.edu

LEARNING OBJECTIVES

1) Identify why MRI-guided radiation therapy has the potential to improve treatment outcomes in the management of pelvic malignancies. 2) Differentiate between rules for safe dose escalation during non-adaptive stereotactic body radiation therapy

(SBRT) versus adaptive MRI-guided SBRT. 3) Develop an MRI-guided adaptive treatment flow for the management of cervical cancer.

RC520D Practical Aspects and Workflow for MR-guided Radiotherapy

Participants
Olga Green, PhD, St. Louis, MO (*Presenter*) Speaker, ViewRay, Inc

For information about this presentation, contact:

ogreen@wustl.edu

LEARNING OBJECTIVES

1) recognize the unique challenges of implementing MRI-guided radiation therapy workflows. 2) develop procedures for safe and efficient delivery of online adaptive radiation therapy. 3) understand the common sources of dosimetric errors in MRI-guided radiation therapy.

Printed on: 10/29/20

RC552

Liver Elastography (Hands-on)

Wednesday, Dec. 4 8:30AM - 10:00AM Room: E264

GI US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

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, Canon Medical Systems Corporation; Research Grant, Esaote SpA; Research Grant, BK Ultrasound; Research Grant, Hitachi, Ltd
Nitin G. Chaubal, MD, MBBS, Thane, India (*Presenter*) Nothing to Disclose
Chander Lulla, MD,MBBS, Mumbai, India (*Presenter*) Nothing to Disclose
Mirko D'Onofrio, MD, Verona, Italy (*Presenter*) Speaker, Bracco Group Speaker, Siemens AG Consultant, Siemens AG Speaker, Hitachi, Ltd
Carlo Filice, MD, Pavia, Italy (*Presenter*) Research Grant, Shenzhen Mindray Bio-Medical Electronics Co, Ltd; Research Grant, Hitachi, Ltd; Research Grant, Esaote SpA; Research Grant, Canon Medical Systems Corporation; Speaker, Shenzhen Mindray Bio-Medical Electronics Co, Ltd
Vito Cantisani, MD, Roma, Italy (*Presenter*) Speaker, Canon Medical Systems Corporation; Speaker, Bracco Group; Speaker, Samsung Electronics Co, Ltd;
Fabrizio Calliada, MD, Pavia, Italy (*Presenter*) Research Grant, Canon Medical Systems Corporation; Speakers Bureau, Hitachi, Ltd; Speakers Bureau, Shenzhen Mindray Bio-Medical Electronics Co, Ltd
Ann E. Podrasky, MD, Miami, FL (*Presenter*) Speakers Bureau, Siemens AG
Michelle L. Robbin, MD, Birmingham, AL (*Presenter*) Consultant, Koninklijke Philips NV; ;
Hisham A. Tchelepi, MD, Los Angeles, CA (*Presenter*) Nothing to Disclose
Norihisa Yada, MD, Kyoto, Japan (*Presenter*) Nothing to Disclose
Laura Maiocchi, MD, Pavia, Italy (*Presenter*) Nothing to Disclose
Patrick Warren, MD, Columbus, OH (*Presenter*) Nothing to Disclose
Maija Radzina, MD,PhD, Riga, Latvia (*Presenter*) Speaker, Canon Medical Systems Corporation
Anil Chauhan, MD, Minneapolis, MN (*Presenter*) Nothing to Disclose
Giovanna Ferraioli, MD, Pavia, Italy (*Presenter*) Speaker, Koninklijke Philips NV; Speaker, Hitachi, Ltd; Speaker, Canon Medical Systems Corporation; Speaker, Shenzhen Mindray Bio-Medical Electronics Co, Ltd
Cheng Fang, MBBS,FRCR, London, United Kingdom (*Presenter*) Nothing to Disclose
Giuseppe Schillizzi, Roma, Italy (*Presenter*) Nothing to Disclose
Daniele Fresilli, Roma, Italy (*Presenter*) Nothing to Disclose
Vladimir Mitkov, MD, Moscow, Russia (*Presenter*) Speaker, Canon Medical Systems Corporation; Speaker, General Electric Company; Speaker, Koninklijke Philips NV; Speaker, Siemens AG; Speaker, Sonoscape Co, Ltd; Speaker, SuperSonic Imagine; Spouse, Speaker, Canon Medical Systems Corporation; Spouse, Speaker, General Electric Company; Spouse, Speaker, Koninklijke Philips NV; Spouse, Speaker, Siemens AG; Spouse, Speaker, Sonoscape Co, Ltd; Spouse, Speaker, SuperSonic Imagine;
Daniela Elia, Roma, Italy (*Presenter*) Nothing to Disclose
Guzman I. Lopardo Villarino, MD, Buenos Aires City, Argentina (*Presenter*) Nothing to Disclose
Giorgia Polti, Rome, Italy (*Presenter*) Nothing to Disclose
Eleonora Polito, Rome, Italy (*Presenter*) Nothing to Disclose
Yana Solskaya, MD, Riga, Latvia (*Presenter*) Nothing to Disclose
Olga Guiban, Rome, Italy (*Presenter*) Nothing to Disclose
Patrizia Pacini, Rome, Italy (*Presenter*) Nothing to Disclose
Adrian K. Lim, MD, FRCR, London, United Kingdom (*Presenter*) Luminary, Canon Medical Systems Corporation; Grant, Koninklijke Philips NV; Speakers Bureau, Siemens AG

For information about this presentation, contact:

thaneultrasound@gmail.com

riaclinic@gmail.com

mradzina@gmail.com

vito.cantisani@uniroma1.it

yana.solskaya@gmail.com

Chengfang@nhs.net

vv@mitkov.ru

LEARNING OBJECTIVES

1) Improve basic knowledge and skills relevant to clinical practice in Liver elastography of the participants. 2) Teach how to practice liver elastography. 3) Show live how to do a proper examination, providing tips and tricks and updating current knowledge on different techniques. 4) Practical hands-on and slide presentation with key messages will be used.

Printed on: 10/29/20

MSCP42

Case-based Review of Pediatric Radiology (Interactive Session)

Wednesday, Dec. 4 10:30AM - 12:00PM Room: E450B

CH GI MK NR PD

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Edward Y. Lee, MD, Boston, MA (*Director*) Nothing to Disclose

Sub-Events

MSCP42A Pediatric Spine Disorders

Participants
Amna A. Kashgari, MD, Riyadh, Saudi Arabia (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

drakashgari@gmail.com

LEARNING OBJECTIVES

1) Review normal development of the spinal column and spinal neuralaxis. 2) Describe in the imaging finding in spondylodysplasias. 3) Review spinal Dysraphism classification.

ABSTRACT

The normal development and variations of the pediatric spinal column will be discused. Differentiating acquired from congenital spine and spinal cord pathologies using a case based approach.

MSCP42B Pediatric Pulmonary Disorders

Participants
Abbey Winant, MD, Boston, MA (*Presenter*) Spouse, Research Grant, Bristol-Myers Squibb Company; Spouse, Research Grant, Novartis AG; Spouse, Research Consultant, Tango Therapeutics

ABSTRACT

Congenital and acquired pediatric pulmonary cases will be presented. Discussion will include: 1) description of the imaging features for each condition, 2) tips for differentiating between conditions with similar imaging findings, 3) up-to-date recommendations for management and follow-up for each condition.

MSCP42C Pediatric Gastrointestinal Disorders

Participants
Emilio Inarejos Clemente, MD, Barcelona, Spain (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

emilioinarejos@gmail.com

LEARNING OBJECTIVES

1) Identify the most relevant imaging findings for each entity. 2) Define imaging key features of each condition to establish a correct diagnosis. 3) State a reasonable differential diagnosis of each case.

ABSTRACT

Congenital and acquired pediatric gastrointestinal cases will be explained.Each case will include a brief overview with its corresponding differential diagnosis.

MSCP42D Pediatric Musculoskeletal Disorders

Participants
Michael Francavilla, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

francavilm@email.chop.edu

ABSTRACT

A series of pediatric musculoskeletal cases will be presented to illustrate: 1- Characteristic appearances of lower extremity MSK disorders 2- Neoplasms favoring the tibia 3- Hip disorders characterstic of children

SSK07

Gastrointestinal (Focal Liver Lesions Non-HCC)

Wednesday, Dec. 4 10:30AM - 12:00PM Room: S501ABC

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Myeong-Jin Kim, MD, PhD, Seoul, Korea, Republic Of (*Moderator*) Research grant, Bayer Pharma AG; Honoraium, Guerbet SA, GE healthcare, Philips, and Siemens Healthineers
Victoria Chernyak, MD,MS, Bronx, NY (*Moderator*) Consultant, Bayer AG
Veronica L. Cox, MD, Houston, TX (*Moderator*) Nothing to Disclose

Sub-Events

SSK07-01 Diagnostic Performance of LR-M Criteria and Imaging Spectrum of Primary Hepatic Malignancies

Wednesday, Dec. 4 10:30AM - 10:40AM Room: S501ABC

Participants
Seung-Seob Kim, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Sunyoung Lee, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jin-Young Choi, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Mi-Suk Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Myeong-Jin Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Research grant, Bayer Pharma AG; Honoraium, Guerbet SA, GE healthcare, Philips, and Siemens Healthineers

For information about this presentation, contact:

k2s0127@yuhs.ac

PURPOSE

To evaluate diagnostic performance of LR-M criteria for differentiating hepatocellular carcinoma (HCC), intrahepatic mass-forming cholangiocarcinoma (iCC), and combined hepatocellular-cholangiocarcinoma (cHCC-CC) and to compare the imaging features of each type

METHOD AND MATERIALS

In this retrospective, case-control study, 110 patients with surgically proven iCC (n=67) and cHCC-CC (n=43) between June 2013 and June 2018 were enrolled as a case group. Another 110 patients with size-matched HCC were selected as a control group. Two independent readers evaluated imaging findings of preoperative MRI based on LI-RADS version 2018 and assigned LI-RADS category without knowing postsurgical histopathology. Diagnostic performance of LR-M criteria was evaluated and imaging features of iCC, cHCC-CC, and HCC were compared.

RESULTS

In the case group, 91 patients were categorized into LR-M and 15 patients into LR-5 (83% and 14%, respectively), while 13 patients of the control group were categorized into LR-M and 88 patients into LR-5 (12% and 80%, respectively). When more than two features of LR-M criteria were present, it suggested iCC or cHCC-CC with the specificity of 94.5%. Among the case group, findings of LI-RADS major criteria were more frequently seen in patients with cHCC-CC, while those of LR-M criteria were more prominent in those with iCC. Among the lesions with peripheral arterial phase hyperenhancement, enhancing rim was evenly uniform in 38 patients with iCC (out of 52 patients, 73.1%), while 14 patients with cHCC-CC showed irregularly thickened area of enhancing rim (out of 25 patients, 56%; p=0.022).

CONCLUSION

Diagnostic performance of LR-M criteria is desirable, and combination of imaging features is helpful for differentiating LR-M from HCC. The presence of irregularly thickened area of enhancing rim may suggest cHCC-CC rather than iCC.

CLINICAL RELEVANCE/APPLICATION

The presence of more than two LR-M findings is highly suggestive of iCC or cHCC-CC. Combination of imaging features may be helpful for differentiating primary liver malignancies.

SSK07-02 Pre-Operative Prediction of MVI in Liver Primary Tumors: Value of LI-RADS v2018 in Combination with Non-LI-RADS MR Features

Wednesday, Dec. 4 10:40AM - 10:50AM Room: S501ABC

Participants
Jingbiao Chen, Guangzhou, China (*Presenter*) Nothing to Disclose
Sichi Kuang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Sidong Xie, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Linqi Zhang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose

Binjun He, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Ying Deng, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Hao Yang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Yao Zhang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Kathryn J. Fowler, MD, San Diego, CA (*Abstract Co-Author*) Consultant, 12 Sigma Technologies; Researcher, Nuance Communications, Inc; Contractor, Midamerica Transplant Services; ;
Claude B. Sirlin, MD, San Diego, CA (*Abstract Co-Author*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc
Jin Wang, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate whether a combination of LI-RADS v2018 MR features, non-LI-RADS MR features, and AFP can pre-operatively predict microvascular invasion (MVI) in primary liver cancers.

METHOD AND MATERIALS

This retrospective single-center study was approved by our institutional review board with waived informed consent requirement. Between 2014 and 2018, 188 patients had pre-operative MRI within 1 month before hepatectomy for surgically confirmed primary liver cancers. LI-RADS and non-LI-RADS (non-smooth tumor margin, two-trait predictor, and peritumoral enhancement) MR features were retrospectively assessed by two radiologists in consensus. In patients with multifocal tumors, only the largest tumor was evaluated. LI-RADS v2018 categories were assigned based on major features. MVI was assessed by a liver pathologist on resected tumor specimens. Pre-operative AFP was recorded. Univariate and multivariate analyses were used to assess MVI predictors. Sensitivity, specificity, accuracy, positive predictive value (PPV), and negative predictive value (NPV) of a multivariate prediction model were estimated.

RESULTS

173 (92.0%) patients had hepatocellular carcinoma, 11 (5.9%) had intrahepatic cholangiocarcinoma, and 4 (2.1%) had combined hepatocellular and cholangiocarcinoma. MVI was present in 85/188 (45%) patients. Pre-operative LI-RADS categories of LR-3, LR-4, LR-5 and LR-M were assigned in 5 (2.7%), 9 (4.8%), 154 (81.9%), and 20 (10.6%) patients, respectively. LR-M (OR: 5.258, P=0.005), mosaic architecture (OR: 3.159, P=0.002), and non-smooth tumor margin (OR: 2.410, P=0.009) were independent predictors of MVI (Table 1, Figure 1). The sensitivity, specificity, accuracy, PPV, and NPV of the prediction model were 5.9%, 98.1%, 56.4%, 71.4%, and 55.8%, respectively.

CONCLUSION

This single-center, retrospective study indicated combining LR-M, mosaic architecture, and non-smooth tumor margin can predict MVI with high specificity. Multi-centric, prospective studies are needed to confirm the accuracy of the model for predicting MVI in primary liver cancers.

CLINICAL RELEVANCE/APPLICATION

This retrospective single-center study showed the potential value of combining LI-RADS v2018 and non-LI-RADS MR features in predicting MVI in primary liver cancers. Further studies are warranted.

SSK07-03 Differentiating New Hepatic Metastases from Focal Hepatopathy in Patients during Treatment for Malignancy

Wednesday, Dec. 4 10:50AM - 11:00AM Room: S501ABC

Participants
Steffen Haider, MD, New York, NY (*Presenter*) Nothing to Disclose
Lyndon Luk, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Benjamin Navot, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Firas S. Ahmed, MBChB, MPH, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Simona De Michele, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Jonathan Susman, MD, Englewood, NJ (*Abstract Co-Author*) Research Consultant, BioSphere Medical, Inc
Elizabeth M. Hecht, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

sth9053@nyp.org

PURPOSE

To differentiate between liver metastases versus benign focal hepatopathy (FH) that develops over the course of medical or surgical treatment of malignancy.

METHOD AND MATERIALS

Between 2010 and 2018, there were 1179 consecutive biopsies (1069 patients) of hepatic lesions suspicious for malignancy. 924 were True Pos, 169 True Neg (TN), 43 False Neg and 43 lost to follow up. Among the TN were 22 FHs defined as new lesions following oncologic treatment and histologically as steatosis, sinusoidal and biliary congestion/obstruction or inflammation. Cirrhotic patients, primary hepatic tumors and abscesses were excluded. Patients with FH and metastases were matched for age, malignancy-type and treatment regimen. 3 abdominal radiologists (1, 1, 3 y post-fellowship) blinded to pathology reviewed pre-biopsy MR (40 malignant: 13 FH) and CT (53: 12); 3 FH pts had both MRI and CT. A 5-point Likert scale (1: definitely benign, 5: definitely malignant) and imaging characteristics were assessed. A training data set for readers was provided to introduce a common lexicon. Univariate analyses (Chi-Sq, T-test), logistic regression and inter-rater reliability (kappa, spearman, ICC) were performed.

RESULTS

Characteristics of patients with FHs included: pancreatobiliary malignancies (68%), hepatobiliary/GI surgery or stent (77%) and chemotherapy within 1y prior to biopsy (50%). Results for MR: Likert 2.3-2.5 for FH vs 3.6-4.4 for metastases (p<.05, correlation=.49). Compared to FH, metastases were associated with multiplicity (>3 lesion/liver), larger size, arterial rim-enhancement, portal venous rim-enhancement/central hypoenhancement and restricted diffusion (P< 0.05, all readers, univariate, k=.48-.81 except arterial rim k=0.22, ICC=.91). Lesion multiplicity was associated with metastasis on multivariate analysis. For CT: Likert 2.3-4.0 for FH vs 3.8-4.9 for metastases (p<.05, correlation .47-.58). Only non-spherical shape was associated with FH (p<.05, all readers, k=.33-.89 except arterial rim .08-.22, ICC .97-.99).

CONCLUSION

Multiplicity, size, enhancement and diffusion characteristics may be helpful to distinguish FH from metastases on MR whereas only non-spherical shape was helpful on CT.

CLINICAL RELEVANCE/APPLICATION

Identification of FH could increase confidence in radiologic-pathologic correlation and limit biopsies following the medical-surgical treatment of malignancy. MRI may be more helpful than CT in distinguishing FH from metastases.

SSK07-04 Does Volumetric Functional MRI Improve Fudan Clinical Prognostic Scoring System for Unresectable Intrahepatic Cholangiocarcinoma Treated with Systemic Chemotherapy?

Wednesday, Dec. 4 11:00AM - 11:10AM Room: S501ABC

Participants
Ankur Pandey, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Mohammadreza Shaghaghi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Roya Rezvani Habibabadi, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Sanaz Ameli, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

apandey9@jhmi.edu

PURPOSE

To assess the incremental value of volumetric functional MRI-derived parameters over Fudan clinical prognostic scoring system in patients with intrahepatic cholangiocarcinoma (ICCA) treated with systemic chemotherapy.

METHOD AND MATERIALS

This retrospective, HIPAA compliant and IRB approved study included 68 patients with unresectable ICCA (age, 65±14 yrs; 27 men [40%]). Patients underwent systemic chemotherapy after baseline MRI (including contrast-enhanced and DWI with ADC mapping). Single largest tumor was assessed by a single experienced abdominal radiologist for anatomic and functional (viable tumor volume, percentage viable tumor volume [100 × viable tumor volume/whole tumor volume], viable tumor burden [100 × viable tumor volume/whole liver volume], and ADC) parameters. Cox regression was used to identify the strongest functional predictor of overall survival. Prognostic scores were calculated for each patient using the established Fudan score (utilizing serum alkaline phosphatase level, carbohydrate antigen 19-9 level, tumor margin type, tumor size, and number of intrahepatic tumors), as well as modified Fudan score (with functional MRI parameter replacing subjective tumor margin). The performance of both the scores was measured by C-index and assessed by comparing Kaplan-Meier survival estimates in different risk groups. Predictive accuracy of both scoring systems was compared. P<0.05 was considered significant.

RESULTS

Among the volumetric functional MRI parameters, ADC (>1350x10-6mm2/s vs. <=1350) showed the strongest association with overall survival (HR, 6.0; 95% CI, 3.0-11.9; P<0.001). Both Fudan and modified Fudan score (replacing the tumor margin [subjective] with ADC [quantitative]) provided prognostic prediction with differences in OS among intermediate vs. high vs. very high-risk groups (Fudan, P=.04; modified Fudan, P=0.001). C-index of the modified Fudan score for predicting survival was 0.82 (95% CI, 0.74-0.90), higher (P=0.006) than the C-index of the original Fudan score (0.67[95% CI, 0.55-0.79]).

CONCLUSION

Supplementing Fudan model with ADC provided more accurate prognosis for ICCA patients undergoing systemic chemotherapy, improving the survival prediction performance by 15%.

CLINICAL RELEVANCE/APPLICATION

Volumetric MRI can increase accuracy of the only available prognostic scoring system for ICCA treated with systemic chemotherapy by replacing the highly subjective tumor margin with more objective ADC.

SSK07-05 Diagnostic Performance of the Liver Imaging Reporting and Data System Version 2018 for Intrahepatic Cholangiocarcinoma

Wednesday, Dec. 4 11:10AM - 11:20AM Room: S501ABC

Participants
Xianlun Zou, MD, Wuhan, China (*Presenter*) Nothing to Disclose
Yaqi Shen, PhD, MD, Wuhan, China (*Abstract Co-Author*) Nothing to Disclose
Zhen Li, MD, PhD, Wuhan, China (*Abstract Co-Author*) Nothing to Disclose

Daoyu Hu, Wuhan, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

zouxianlun2010@163.com

PURPOSE

To evaluate the diagnostic performance of the Liver Imaging Reporting and Data System version 2018 (LI-RADS v2018) for Intrahepatic Cholangiocarcinoma (ICC).

METHOD AND MATERIALS

A total of 78 primary liver cancer with either ICC (n = 39) or hepatocellular carcinoma (HCC) (n = 39) were retrospectively reviewed. ICCs and HCCs were one-to-one matched according to age, tumor size and background disease of liver. All the patients were at high risk for HCC according to LI-RADS v2018 and performed manetic resonance imaging (MRI) examination before surgery or biopsy. The MRI protocols included routine MRI sequences, diffusion-weighted imaging (DWI) and dynamic imaging. Two readers blinded to pathology findings independently evaluated the MR images for each lesion and assigned LI-RADS categories, scoring major and ancillary features according to LI-RADS v2018. Interobserver agreements of LI-RADS category assignment and the diagnostic performance of LI-RADS v2018 in categorizing ICC were analyzed.

RESULTS

The LI-RADS categories of the 39 IMCCs by reviewer 1 include LR-4 (n=5), LR-TIV(HCC) (n=3), LR-M (n=27) and LR-TIV(M) (n=4). In the HCC group, the LI-RADS categories by reviewer 1 include LR-4 (n=7), LR-5 (n=28), LR-TIV(HCC) (n=1) and LR-M (n=3). In the results of reviewer 2, the LI-RADS categories of ICC include LR-4 (n=4), LR-TIV(HCC) (n=2), LR-M (n=26) and LR-TIV(M) (n=7); the LI-RADS categories of HCC include LR-4 (n=3), LR-5 (n=30), LR-TIV(HCC) (n=2) and LR-M (n=4). Interobserver agreements of LI-RADS category assignment were excellent (Kappa= 0.815;95% CI:0.711-0.919;P<0.001). Regarding LR-M and LR-TIV(M) categories as positive, LR-4, LR-5 and LR-TIV(HCC) as negative, the sensitivity, specificity and accuracy of LI-RADS v2018 in categorizing ICC as LR-M or LR-TIV(M) were 79.5%, 92.3%, 85.9% (reviewer 1) and 84.6%, 89.7%, 87.2% (reviewer 2) respectively.

CONCLUSION

LI-RADS v2018 performs high sensitivity, specificity and accuracy in categorizing ICC as LR-M or LR-TIV(M). However, a small part of ICC and HCC may present atypical imaging features, resulting in wrong LI-RADS categories.

CLINICAL RELEVANCE/APPLICATION

LI-RADS v2018 performs high sensitivity, specificity and accuracy in categorizing ICC as LR-M or LR-TIV(M). However, a small part of ICC and HCC may present atypical imaging features, resulting in wrong LI-RADS categories.

SSK07-06 Gd-EOB MRI for Subtype Differentiation of Hepatocellular Adenomas

Wednesday, Dec. 4 11:20AM - 11:30AM Room: S501ABC

Participants
Timo A. Auer, MD, Berlin, Germany (*Presenter*) Nothing to Disclose
Uli Fehrenbach, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Christian Grieser, MD, Bremen, Germany (*Abstract Co-Author*) Nothing to Disclose
Tobias Penzkofer, MD, Berlin, Germany (*Abstract Co-Author*) Researcher, AGO; Researcher, Aprea AB; Researcher, Astellas Group; Researcher, AstraZeneca PLC; Researcher, Celgene Corporation ; Researcher, Genmab A/S; Researcher, Incyte Coporation; Researcher, Lion Biotechnologies, Inc; Researcher, Takeda Pharmaceutical Company Limited; Researcher, Morphotec Inc; Researcher, Merck & Co, Inc; Researcher, Tesaro Inc; Researcher, F. Hoffmann-La Roche Ltd;
Bernd K. Hamm III, MD, Berlin, Germany (*Abstract Co-Author*) Research Consultant, Canon Medical Systems Corporation; Stockholder, Siemens AG; Stockholder, General Electric Company; Research Grant, Canon Medical Systems 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
Timm Denecke, MD, Berlin, Germany (*Abstract Co-Author*) Speaker, Bayer AG Travel support, Bayer AG

For information about this presentation, contact:

timo-alexander.auer@charite.de

PURPOSE

Evaluate MRI Gd-EOB enhancement characteristics to differentiate between subtypes of hepatocellular adenomas (HCA).

METHOD AND MATERIALS

48 patients with 79 histopathologically proven HCA who underwent gadoxetic acid-enhanced MRI were enrolled (standard of reference: surgical resection). Quantitative (lesion to liver enhancement) measurements and qualitative imaging features were evaluated by two blinded radiologists. Inter-reader variability was tested. Additionally, voxel heterogeneity was evaluated using texture analysis (pyradiomics).

RESULTS

Overall, 24%(19/79) HHCA, 47%(37) IHCA, 6.5%(5) bHCA and 22.5%(18) UHCA were anayzed. In the hepatobiliary phase (hbp) 87.5%(69/79) of all adenomas were rated as hypo- to isointense. 66%(52/79) showed a heterogeneous Gd-EOB-uptake. 100% of all IHCA and 80% of all bHCA were rated with a heterogenous uptake of at least 0-25%($p<0.05$) (HHCA: 26%(5/19); UHCA: 33% (6/18); $p>0.05$), while 63%(24/37) of all IHCA showed a heterogeneous uptake of at least 50% or more ($p<0.001$). Quantitative ROI based analyses showed no significant difference between the subtypes ($p>0.05$). Volume-based analyses showed a significant increased voxel heterogeneity for IHCA /variance of mean SI: 6465.48; $p=0.038$) when divided into IHCA and other (vs. 2681.8).

CONCLUSION

Gd-EOB MRI imaging has an additional value for subtype differentiation of HCA, the typical heterogeneous hbp-uptake IHCA can be identified reliably. Furthermore, when combing typical morphologic MR-appearances of the other HCA-subtypes and their Gd-EOB behavior sensitivity increases significantly.

CLINICAL RELEVANCE/APPLICATION

Potential of a noninvasive MRI subtype differentation of HCA to avoid unnessecary surgical resection and/or intervention and to provide evidence in terms of guidelines for benign liver lesions.

SSK07-07 MDCT Imaging Feature Related with Histopathologic Growth Pattern to Predict Response of Bevacizumab-Based Chemotherapy in Patients with Colorectal Liver Metastases

Wednesday, Dec. 4 11:30AM - 11:40AM Room: S501ABC

Participants
Jin Cheng, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Fan Chai, Beijing, China (*Presenter*) Nothing to Disclose
Yinli Zhang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Nan Hong, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Danhua Shen, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Jing Zhou, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yingjiang Ye, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yi Wang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

chengjin@pkuph.edu.cn

PURPOSE

To investigate the performance of MDCT imaging features related with histopathological growth patterns (HGPs) in predicting response of Bevacizumab-based chemotherapy and the 1-year progression free survival (PFS) in patients with of colorectal liver metastases (CRLMs).

METHOD AND MATERIALS

The study was designed as a two-step protocol. In the first-step, between January 2007 and December 2018, patients who had chemo-naïve resected CRLMs and preoperative MDCT were included. HGPs of each resected CRLMs were retrospectively reviewed. Multivariate logistic regression based on clinical, pathological and MDCT imaging factors were used to construct a model in predicting HGPs. The second step included patients who had unresectable CRLMs and were treated with the Bevacizumab-based chemotherapy between January 2012 and January 2018. The factors related with HGPs were used to build a model to predict the objective response rate (ORR) and the 1-year PFS by multivariate analyses.

RESULTS

A total of 95 resected CRLMs with desmoplastic (n=52) and replacement (n=43) HGP lesions were assessed in the first-step study. The enhanced rim on portal venous phase (PVP) was identified as the only independent predictor in distinguishing the desmoplastic HGP with the AUC of 0.761(95%CI: 0.661-0.860, P<0.001). In the second-step study, 50 CRLM patients with Bevacizumab-based chemotherapy were included. The enhanced rim on PVP was identified as the only independent significant predictor of ORR and 1-year PFS by using the multivariable analyses.

CONCLUSION

The enhanced rim on PVP of the baseline MDCT images, which related with the desmoplastic HGP of CRLM, was identified as the independent prognostic predictor of good outcome for CRLM patients with Bevacizumab-based chemotherapy.

CLINICAL RELEVANCE/APPLICATION

The HGP of CRLMs is capable of predicting response to Bevacizumab treatment and long-term survival. However, the diagnosis of HGP could only be made via histopathological analysis and the clinical application is restricted. In this present study, the baseline MDCT imaging feature of enhanced rim on portal venous phase, related with the desmoplastic HGP, was identified as the independent prognostic predictor of good outcome for CRLM patients with Bevacizumab-based chemotherapy. This imaging feature could be a potential biomarker in patient selection of target agent treatment, as well as the outcome predicting in patient with CRLMs.

SSK07-08 Prediction of Histopathologic Growth Patterns of Colorectal Liver Metastases with a Noninvasive Imaging Method

Wednesday, Dec. 4 11:40AM - 11:50AM Room: S501ABC

Participants
Jin Cheng, MD, Beijing, China (*Presenter*) Nothing to Disclose
Jingwei Wei, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yinli Zhang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yuqi Han, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Dongsheng Gu, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Gongwei Wang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Nan Hong, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yingjiang Ye, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Jie Tian, PhD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yi Wang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

chengjin@pkuph.edu.cn

PURPOSE

This study was to predict histopathologic growth patterns (HGPs) in colorectal liver metastases (CRLMs) with radiomics model.

METHOD AND MATERIALS

Patients with chemotherapy-naive CRLMs who underwent abdominal contrast-enhanced MDCT followed by partial hepatectomy between January 2007 and January 2018 were included in this retrospective study. Hematoxylin- and eosin-stained histopathologic sections of CRLMs were reviewed, with HGPs defined according to international consensus. Lesions were divided into training and validation datasets based on date of treatment. Radiomic features were extracted from pre- and post- contrast (arterial and portal venous) phase MDCT images, with review focusing on the segmented tumor-liver interface (TLI) zones of CRLMs. Minimum redundancy maximum relevance (MRMR) and decision tree (DT) methods were used for radiomics modeling. Multivariable logistic regression analyses and ROC curves were used to assess the predictive performance of these models in predicting HGP types.

RESULTS

A total of 82 CRLMs with histopathologic-demonstrated desmoplastic (n = 54) or replacement (n = 28) HGPs were assessed. The radiomics signature consisted of 20 features of each phase selected. The fused arterial and portal venous phase radiomics signature demonstrated the best predictive performance in distinguishing between replacement and desmoplastic HGPs (AUCs of 0.962 and 0.870 in the training and validation cohorts, respectively). The radiomics model showed good discrimination (C-indices of 0.974 and 0.765 in the training and validation cohorts, respectively).

CONCLUSION

A radiomics model derived from MDCT images may effectively predict the HGP of CRLMs, thus providing a basis for prognostic stratification and therapeutic decision-making.

CLINICAL RELEVANCE/APPLICATION

1. Radiomics model derived from MDCT images may effectively predict the HGP of CRLMs.2. Radiomics can supplement radiologists' visual interpretation in morphologically similar tumors.

SSK07-09 Evaluation of Pre and Post-Treatment LI-RADS Categories as Predictors of Overall Survival in HCC Patients Undergoing Transarterial Embolization

Wednesday, Dec. 4 11:50AM - 12:00PM Room: S501ABC

Participants
William Ormiston, MBChB, Auckland, New Zealand (*Presenter*) Nothing to Disclose
Hooman Yarmohammadi, MD, New York, NY (*Abstract Co-Author*) Grant, Guerbet SA
Stephanie Lobaugh, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Juliana B. Schilsky, MS, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Seth S. Katz, MD, PhD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Maria D. Lagratta, MD, Rumson, NJ (*Abstract Co-Author*) Nothing to Disclose
Sara Velayati, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Junting Zheng, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Marinela Capanu, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Richard Kinh Gian Do, MD,PhD, New York, NY (*Abstract Co-Author*) Consultant, Bayer AG; Author, Reed Elsevier; Spouse, Author, Wolters Kluwer nv; Spouse, Data Monitoring Committee, Alk Abello

For information about this presentation, contact:

ormistonw@gmail.com

PURPOSE

LI-RADS treatment response (LR-TR) algorithm has recently been proposed for the assessment of HCC response to locoregional therapy. The aim of our study was to evaluate associations between pretreatment (preTx) and posttreatment (postTx) LR-TR categories with overall survival (OS) in patients with HCC after transarterial embolization (TAE).

METHOD AND MATERIALS

In this IRB approved retrospective single center study, consecutive patients between December 2003 and December 2017 were included if they had 1 or 2 lesions and underwent TAE +/- ablation, with no prior therapy nor subsequent liver transplantation. Two radiologists (R1 and R2) reviewed preTx and postTx imaging to assign preTx LI-RADS diagnostic and postTx LR-TR categories, with agreement measured by kappa statistics. Associations with OS were examined on preTx and postTx variables, including tumor size, preTx LR categories and LR-TR categories (Viable, Equivocal, Nonviable) using Kaplan-Meier method and Cox proportional hazard regression.

RESULTS

88 patients (median 71 yo, 71 M, 17 F) were included, the majority having a single lesion (n=79, 83.2%) and either A or B BCLC stage (n=56, 63.6%). Median OS from first embolization was 35.5 months (95%CI: 26.4 - 50.2). For both readers, preTx tumor size (Hazard ratio (HR) R1 1.099 (95% CI: 1.030-1.172), R2 1.083 (95% CI: 1.016-1.154)) and LR-TIV vs LR-5 (HR R1 3.511 (95% CI: 1.617-7.625), R2 2.174 (95% CI: 1.010-4.682)) were associated with OS ($p<0.05$). PostTx tumor size (HR R1 1.158 (95% CI: 1.079-1.243), R2 1.135 (95% CI: 1.054-1.223)) and LR-TR Viable vs Nonviable category (HR R1 3.181 (95% CI: 1.766-5.728), R2 2.701 (95% CI: 1.498-4.872)) were associated with OS ($p<0.005$). Median OS for LR-TR Viable patients were 22.91 (R1, 95% CI: 17.85-31.96) and 25.64 months (R2, 95% CI: 18.58-35.70), compared to 64.21 months (R1 and R2, 95% CI: 42.71-92.45 and 36.30-94.09, respectively) for Nonviable patients. Interreader agreements were moderate for preTx LR categories (k=0.567 95% CI: 0.359-0.775) and substantial for postTx LR-TR categories (0.691 95% CI: 0.568-0.815).

CONCLUSION

Both preTx LI-RADS categories and postTx LR-TR categories were associated with OS in HCC patients following TAE.

CLINICAL RELEVANCE/APPLICATION

LI-RADS treatment response categories show potential as a surrogate endpoint for overall survival in HCC patients treated by transarterial embolization. Further validation is needed in larger multi-center studies.

Printed on: 10/29/20

SSK08

Gastrointestinal (Dual-energy CT)

Wednesday, Dec. 4 10:30AM - 12:00PM Room: S502AB

BQ CT GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Avinash R. Kambadakone, MD, Boston, MA (*Moderator*) Research Grant, General Electric Company; Research Grant, Koninklijke Philips NV
Lakshmi Ananthakrishnan, MD, Irving, TX (*Moderator*) Nothing to Disclose
Mark D. Kovacs, MD, Charleston, SC (*Moderator*) Nothing to Disclose

Sub-Events

SSK08-01 Extracellular Volume Quantification of Liver Using Dual-Energy CT: Utility for Prediction of Liver-Related Events in Cirrhosis

Wednesday, Dec. 4 10:30AM - 10:40AM Room: S502AB

Participants
Seong Jun Bak, MD, Jinju, Korea, Republic Of (*Presenter*) Nothing to Disclose
Ji Eun Kim, MD,PhD, Jinju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Kyungsoo Bae, MD, Changwon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jae Min Cho, MD, Jinju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyun Ok Kim, Jinju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

wldmsrla80@hanmail.net

PURPOSE

To determine whether quantification of liver extracellular volume fraction (fECV) using dual-energy CT allows prediction of liver-related events (LRE) in patients with cirrhosis.

METHOD AND MATERIALS

This retrospective study included 305 patients with cirrhosis who underwent dual source dual-energy liver CT and had serum markers within 2 weeks of initial CT imaging. The fECV score was measured using iodine map of equilibrium phase images obtained 3 minutes after contrast injection at 100 kVp and Sn140 kVp. Association of fECV score and serum markers with LRE was investigated. A risk model combining fECV score (<27 versus = or >27%) and albumin level (<4 versus = or >4 g/dL) was constructed for predicting LRE.

RESULTS

Increased fECV score (odds ratio, 1.27; 95% confidence interval (CI), 1.15, 1.40) was independently associated wtih decompensated cirrhosis at baseline (n = 85) along with Model for End Stage Liver Disease score (odds ratio, 1.32; 95% CI, 1.07, 1.63). In patients with compensated cirrhosis, 10.5% (23 of 220) experienced LRE during a median follow-up period of 2.0 years (decompensation, n =14; hepatocellular carcinoma, n = 9). fECV score (hazard ratio, 1.40; 95% CI, 1.22, 1.62) and albumin level (hazard ratio, 0.26; 95% CI, 0.09, 0.73) were independently predictive of LRE. Mean times to LRE in patients at high (16.5 months, n = 18), intermediate (25.6 months, n = 44), and low (30.5 months, n = 158) risk of LRE were significantly different (p < 0.0001).

CONCLUSION

The fECV score derived from dual-energy CT images allows prediction of LRE in patients with cirrhosis.

CLINICAL RELEVANCE/APPLICATION

The fECV score derived from iodine map of dual-energy CT can predict hepatic decompensation or hepatocellular carcinoma in cirrhotic patients. Dual-energy scanning is recommended as a part of liver CT during the follow-up of cirrhotic patients.

SSK08-02 Assessment of Peritoneal Carcinomatosis Using Iodine Overlays from Spectral Detector Computed Tomography

Wednesday, Dec. 4 10:40AM - 10:50AM Room: S502AB

Participants
Simon Lennartz, MD , Cologne, Germany (*Presenter*) Institutional Research Grant, Koninklijke Philips NV
Karin Slebocki, Cologne, Germany (*Abstract Co-Author*) Nothing to Disclose
David Zopfs, MD, Cologne, Germany (*Abstract Co-Author*) Nothing to Disclose
Nuran Abdullayev, MD, Cologne, Germany (*Abstract Co-Author*) Nothing to Disclose
Markus le Blanc, Cologne , Germany (*Abstract Co-Author*) Nothing to Disclose
Christian Wybranski, MD, Magdeburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Anton Wagner, MD, Cologne, Germany (*Abstract Co-Author*) Nothing to Disclose

David C. Maintz, MD, Koln, Germany (*Abstract Co-Author*) Nothing to Disclose
Nils Grosse Hokamp, MD, Koln, Germany (*Abstract Co-Author*) Speakers Bureau, Koninklijke Philips NV
Thorsten Persigehl, MD, Koeln, Germany (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Simon.Lennartz@uk-koeln.de

PURPOSE

Peritoneal carcinomatosis (PC) is a prognostically relevant metastatic condition which can be difficult to differentiate from postoperative peritoneal alterations, particularly in early stages. The purpose of this study was to determine whether PC could be distinguished more accurately from benign peritoneal alterations when using spectral detector CT (SDCT)-derived iodine overlays (IO) in addition to conventional images (CI) compared to CI only.

METHOD AND MATERIALS

60 oncologic patients, 30 with PC confirmed by histopathology and 30 with non-malignant peritoneal alterations confirmed by follow-up or PET-CT who received clinically indicated portal-venous phase SDCT scans of the abdomen were retrospectively included. Two experienced and two less experienced radiologists blinded towards patient group and clinical information evaluated presence of PC for each patient and rated conspicuity and diagnostic certainty for up to 5 individual lesions per patient using 5-point Likert scales. Patients were randomized and the subjective assessment was conducted in a session that comprised solely conventional images and a second one which additionally included color-coded iodine overlay images between which a latency period of 6 weeks was administered to minimize recognition bias.

RESULTS

In less experienced readers, IO led to an increased sensitivity / specificity (CI: 0.78 / 0.83 vs. CI+IO: 0.82 / 0.88) for PC. Experienced radiologists showed a higher specificity when employing IO as well, which was however accompanied with a lower sensitivity (Sensitivity / Specificity: CI: 0.92 / 0.80 vs. CI+IO: 0.73 / 0.82). In the subgroup of patients with history of abdominal surgery, the rise in specificity averaged over all readers was even higher (CI: 0.78 vs. CI+IO: 0.91). Median Likert scores for lesion conspicuity were significantly higher for the combination of CI and IO (4 (3-5)) compared to CI only (3 (3-4); $p<=0.05$) while diagnostic certainty was comparable (4 (3-5)).

CONCLUSION

Iodine overlays are instrumental in distinguishing benign from metastatic peritoneal lesions, particularly in patients who underwent abdominal tumor surgery and for less experienced radiologists.

CLINICAL RELEVANCE/APPLICATION

Iodine overlays should be employed as a supplement rather than a surrogate for CI and the additional information on iodine uptake should not outweigh conventional image features suggestive for PC as this might result in lower overall sensitivity.

SSK08-03 The Utility of a Dual-Energy CT Protocol for Acute GI Bleeding (AGIB) in Patients with Recent Overt GI Bleeding

Wednesday, Dec. 4 10:50AM - 11:00AM Room: S502AB

Participants
Payam Mohammadinejad, MD, Rochester, MN (*Presenter*) Nothing to Disclose
Lukasz Kwapisz, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Ashish R. Khandelwal, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Michael L. Wells, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Adam Froemming, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Jeff L. Fidler, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Jay P. Heiken, MD, Rochester, MN (*Abstract Co-Author*) Patent agreement, Guerbet SA; Patent agreement, Bayer AG
Shannon P. Sheedy, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
David Bruining, MD, Rochester, MN (*Abstract Co-Author*) Research Grant, Given Imaging Ltd Consultant, Bracco Group
Stephanie Hansel, MD, Rochester, MN (*Abstract Co-Author*) Research support, Medtronic plc
Yong Lee, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Ahmed Halaweish, PhD, Rochester, MN (*Abstract Co-Author*) Employee, Siemens AG
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; Consultant, Medtronic plc; Consultant, Takeda Pharmaceutical Company Limited; Grant, Takeda Pharmaceutical Company Limited; ;

For information about this presentation, contact:

fletcher.joel@mayo.edu

PURPOSE

To examine the benefit and utility of a two-phase, dual-energy (DE) CT protocol for acute GI bleeding protocol (DE-AGIB-CT) in recent overt GI bleeding.

METHOD AND MATERIALS

Consecutive patients underwent clinically-indicated two-phase DE-AGIB-CT (arterial and portal phases). A gastroenterologist reviewed all clinical information during hospitalization (endoscopy, angio, surgery) to create the reference standard. The clinical radiologist report was used to determine site and presence of active extravasation or other findings (e.g., varices, tumor) causing GI bleeding. After reconciliation, performance of DE-AGIB-CT was estimated. To ascertain the contribution of portal phase and DE images, 3 GI radiologists evaluated all patients with active bleeding, and an equal number of negative exams chosen randomly. Radiologists rated confidence in site and imaging evidence of GI bleeding using only mixed kV arterial images, then with mixed kV portal phase images, and then with dual energy images (50 keV, iodine maps, VNC).

RESULTS

176 patients underwent DE-AGIB-CT for the evaluation of suspected acute GI bleeding. Reference standard identified a cause for active GI bleeding in 56 patients (31.8%). 31 DE-AGIB-CT exams were positive for active extravasation (29% colon, 26% jejunum/ileum, 26% stomach, 19% other). The sensitivity, specificity, positive and negative predictive values of DE-AGIM for correct identification of imaging evidence of GI bleeding was 61% (95%CI:46%-74%), 91% (84%-95%), 74% (58%-86%), and 85% (78%-90%). Sensitivity of active extravasation for cause of AGIB is 30 % (18.37%-43.78%). Out of 31 cases with active contrast material extravasation, in 10 cases (33%), 2/3 radiologists increased confidence in presence of active bleeding by >= 10% by evaluating portal phase images in addition to mixed kV CTA images. Dual energy reconstructions did not increase confidence in any cases.

CONCLUSION

The sensitivity of a dedicated protocol for GI bleeding was less than previously reported, even when imaging criteria were extended beyond luminal extravasation to include identification of causes of GI bleeding. Portal phase imaging increased confidence for GI bleeding.

CLINICAL RELEVANCE/APPLICATION

Physicians should take into consideration the possibility of limited sensitivity of CTA when they rely on this modality in the diagnosis and triaging of patients with acute GI bleeding. Portal phase images improve reader confidence.

SSK08-04 Can Dual-Energy CT Replace Perfusion CT in Monitoring Tumor Therapeutic Response and Predicting Outcomes in Rabbit VX2 Liver Tumors?

Wednesday, Dec. 4 11:00AM - 11:10AM Room: S502AB

Participants
Peijie Lyu, MD, Zhengzhou, China (*Presenter*) Nothing to Disclose
Yan Chen, Zhengzhou, China (*Abstract Co-Author*) Nothing to Disclose
Jianbo Gao, MD, Zhengzhou, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

lvpeijie2@163.com

PURPOSE

To investigate whether dual-energy CT (DECT) can replace perfusion CT (PCT) for monitoring and predicting tumor response to antiangiogenic treatment in rabbit VX2 liver tumors.

METHOD AND MATERIALS

In 54 VX2 liver tumor-bearing rabbits, a optimal contrast-enhanced DECT protocol during the arterial phase (AP) and portal phase (PP) was used to reconstruct images from PCT data obtained from the same scan based on time-attenuation curves. The rabbits were randomized into the control group(n=18),low (n=20) and high dosage(n=16) treated group. The normalized iodine concentrations(nIC) and PCT parameters of tumor at different time points (baseline, 2, 4, 7, 10, and 14 days after treatment) were compared among the three groups. Animals were assessed for survival, tumour size and spread, and tumour and immunohistological markers at 14 days and after 90 days.

RESULTS

There was no statistical difference in the diagnostic performance for respondents and nonrespondents differentiation between nIC and PCT parameters at 2 days and 4 days (area under the receiver operating characteristic curve, 0.73-0.76 vs.0.83-0.86) in the treated group. Radiologic parameters including BF, PEI, nICAP and nICPP at 2 days were positively correlated with the 14-day tumor size change and immunohistological markers(All P values <0.05). The overall survival days correlated with tumors with higher baseline mean transit time values on PCT(P=0.023) but not with nIC in both AP and PP.

CONCLUSION

DECT-derived nIC enabled monitor early antiangiogenic treatment effects but could not predict outcome at the end of treatment of rabbit VX2 liver tumors as compared with PCT parameters.

CLINICAL RELEVANCE/APPLICATION

Dual-energy CT can replace perfusion CT for monitoring tumor response and predicting short-term efficacy to tumor anti-angiogenic therapy but cannot predict outcome at the end of treatment .

SSK08-05 The Influence of Liver Iron Deposition on the Quantification of the Liver-Fat Fraction Using Spectral CT Imaging and Material Decomposition Technique: A Vitro Experiment Study

Wednesday, Dec. 4 11:10AM - 11:20AM Room: S502AB

Participants
Tingting Xie JR, MD, Shenzhen, China (*Presenter*) Nothing to Disclose
Ying Guo, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Guanxun Cheng, Shenzhen, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Our first goal was to build in vitro liver fat-iron deposition model in order to provide a phantom for fat content quantification in study. The second goal was to investigate whether iron deposition has an effect on the quantification of the liver-fat fraction using spectral CT imaging and material decomposition technique.

METHOD AND MATERIALS

Liver-fat-iron mixture samples were prepared as described. A total of 9 samples of 3 groups of homogeneous liver-fat mixed samples with fat volume percentage of 0%, 10%, 20% and 30% were prepared (group A, B and C, added iron with iron concentration of 10,

20 and 30mg/mL, respectively). All samples were scanned on a GE Revolution CT scanner using GSI mode with rapid tube voltage switching between 80-140 kVp, and with tube current 320mA, pitch 1.375mm. After the CT scan reconstructed imaging data were processed with GSI imaging analysis software package for material decomposition and characterization. Fat concentration (on fat-water bases) measured with consistent ROIs placed in the tube center with a diameter of 8mm. Each sample was recorded at 4 different regions for average and statistical analysis. A linear regression was performed using SPSS 19.0 software to analyze the relationship between the measured fat concentration and the liver fat concent (LFC).

RESULTS

(1) We had successfully developed liver iron-fat models in vitro for fat content quantification. With the designed fat volume percentage, the gradient range covered clinical fat content in liver, and the iron concentration of 20, 30 and 40mg/mL simulated the moderate and severe liver iron overload respectively. (2) The model showed good linear relationship between the measured fat concentration and LFC. And the linear correlation equation of group A, B and C were y=0.037+61.85(R^2 = 0.998, P=0.0.02), y=0.134x+263(R^2 = 0.991, P=0.043), and y=0.074x+195(R^2 = 0.998, P=0.02).

CONCLUSION

The presence of iron underestimated of liver fat concent by using spectral CT imaging and material decomposition technique in vitro experiment.

CLINICAL RELEVANCE/APPLICATION

This study demonstrated the feasibility of using CT spectral imaging and material decomposition techniques to precisely quantify the fat concentrations under the condition of simultaneous fat deposition and iron deposition, and the presence of iron was a confounding factor, leading to the underestimation of liver fat content.

SSK08-06 Crohn's Disease Activity Quantified by Iodine Density Obtained from Dual-Energy CT Enterography

Wednesday, Dec. 4 11:20AM - 11:30AM Room: S502AB

Participants
Bari Dane, MD, New York, NY (*Presenter*) Nothing to Disclose
Sean Duenas, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Thomas P. O'Donnell, PhD, New York, NY (*Abstract Co-Author*) Employee, Siemens AG
Justin M. Ream, MD, Dobbs Ferry, NY (*Abstract Co-Author*) Nothing to Disclose
Shannon Chang, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Alec J. Megibow, MD, New York, NY (*Abstract Co-Author*) Consultant, Bracco Group

For information about this presentation, contact:

bari.dane@nyumc.org

PURPOSE

To assess the utility of bowel wall iodine density obtained from dual source, dual-energy CT enterography (DECTE) as a biomarker of Crohn's disease (CD) activity.

METHOD AND MATERIALS

Twenty-two patients with CD imaged with DECTE from 2/2016-5/2018 were retrospectively identified by departmental report search. Iodine maps were created with commercial software (Syngovia®). Iodine content was normalized to the aorta and then manual region of interest cursors were placed over the visibly assessed maximal and minimal iodine density segments of involved and unaffected small bowel. The maximum (Imax) and minimum iodine density (Imin) were recorded. A weighted iodine density (Iweighted) was calculated. Hounsfield units from the blended (50% 150/50% 80kVp) DE images were recorded (mixed HU). The clinical assessment of disease activity using ESR, CRP, fecal calprotectin, colonoscopy/endoscopy and surgery were the reference standard. The CD activity index (CDAI) was used as a separate additional reference standard.

RESULTS

Average Imax and Imin of affected bowel were 4.27±1.11(2.4-7.4)mg/mL and 2.71±0.51(2.2-3.9)mg/mL, respectively. Iodine density of normal-appearing small bowel was 1.40±0.26(0.9-1.9)mg/mL. The Imax and Imin of affected bowel differed significantly from normal bowel (P<0.0001). Mixed HU (101.82±27.5) also statistically differed (46.33±19.62) (P<0.0001). Significant heterogeneity in the affected segments was present on iodine maps. Using overall clinical assessment as the reference standard, all patients with Imin>2.6mg/mL, Iweighted>3.3mg/mL, or Imax>4.7mg/mL had clinically active disease. Using CDAI as the reference standard, all patients with Imin>2.7mg/mL, Iweighted>3.6mg/mL or Imax>5.4mg/mL had clinically active disease. The median effective dose was 4.64±1.68(2.03-8.12)mSv.

CONCLUSION

Iodine density obtained from DECTE highlights regions of maximal activity within affected bowel segments. An iodine density of 2mg/mL appears to be a threshold between normal bowel and those involved with active CD. Iodine density thresholds Imin>2.7mg/mL, Iweighted>3.6mg/mL and Imax>5.4mg/mL appear to indicate clinically active disease.

CLINICAL RELEVANCE/APPLICATION

Because CD activity is heterogeneous, more specific targeting of affected segments can pinpoint therapeutic intervention.

SSK08-07 Can Advanced Tumor Analysis with DECT Iodine Quantification and Radiomics Help Characterize Focal Liver Lesions?

Wednesday, Dec. 4 11:30AM - 11:40AM Room: S502AB

Participants
Fatemeh Homayounieh, MD, Boston, MA (*Presenter*) Nothing to Disclose
Ramandeep Singh, MBBS, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Chayanin Nitiwarangkul, MD, Bangkok, Thailand (*Abstract Co-Author*) Nothing to Disclose

Bernhard Schmidt, PhD, Forchheim, Germany (*Abstract Co-Author*) Employee, Siemens AG
Martin U. Sedlmair, MS, Forchheim, Germany (*Abstract Co-Author*) Employee, Siemens AG
Felix Lades, Forchheim, Germany (*Abstract Co-Author*) Employee, Siemens AG
Subba R. Digumarthy, MD, Boston, MA (*Abstract Co-Author*) Speaker, Siemens AG; Research Grant, Lunit Inc; Researcher, Merck & Co, Inc; Researcher, Pfizer Inc; Researcher, Bristol-Myers Squibb Company; Researcher, Novartis AG; Researcher, F. Hoffmann-La Roche Ltd; Researcher, Polaris Pharmaceuticals, Inc; Researcher, Cascadia Healthcare, LLC; Researcher, AbbVie Inc; Researcher, Gradalis, Inc; Researcher, Clinical Bay; Researcher, Zai Lab
Sanjay Saini, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Mannudeep K. Kalra, MD, Lexington, MA (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, Riverain Technologies, LLC;

For information about this presentation, contact:

maryam.homayounieh@gmail.com

PURPOSE

We assessed a machine learning-based Dual Energy Tumor Analysis (DECT-TA) prototype (Siemens Healthineers) for semiautomatic segmentation and radiomics analysis of benign and malignant liver lesions seen on contrast-enhanced dual-energy CT (DECT).

METHOD AND MATERIALS

Our IRB-approved study included 103 adult patients (mean age 65 ± 15 years; 53 men, 50 women) with benign (n= 60) or malignant (n= 43) hepatic lesions on contrast-enhanced dual-source DECT (Siemens Force or Flash). Most malignant lesions had histologic proof; benign lesions were either stable on follow-up CT or had characteristic benign features on MRI. Low and high kV datasets were de-identified, exported offline, and post-processed with the DECT-TA for semiautomatic segmentation of the volume and rim of each liver lesion. For each segmentation, contrast enhancement and iodine concentrations, as well as 585 radiomics features were derived for different DECT image series. Statistical analyses were performed to determine if DECT-TA radiomics can differentiate benign from malignant liver lesions.

RESULTS

Iodine concentration, normalized iodine concentrations, mean iodine in the benign and malignant lesions were significantly different ($p < 0.0001$-0.0084; AUC: 0.695 - 0.856). Iodine quantification and radiomics features from lesion rims (AUC up to 0.877) had higher accuracy for differentiating liver lesions as compared to the values from lesion volumes (AUC up to 0.856). Random forest classification yielded higher accuracy for differentiating liver lesions with both the DECT iodine quantification (AUC= 0.91) than DECT radiomics (AUC= 0.90).

CONCLUSION

The DECT-TA prototype enables accurate differentiation between benign and malignant hepatic lesions based on iodine quantification and radiomics features.

CLINICAL RELEVANCE/APPLICATION

DECT segmentation, iodine quantification and radiomics can be used for characterizing focal liver lesions.

SSK08-08 Dual-Energy CT Improves Radiologist Confidence in Diagnosing Acute Bowel Ischemia Compared with Conventional CT

Wednesday, Dec. 4 11:40AM - 11:50AM Room: S502AB

Participants
Aung Zaw Win, FRCR,MRCP, Manchester, United Kingdom (*Presenter*) Nothing to Disclose
Luis S. Guimaraes, MD,PhD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Patrik Rogalla, MD, Toronto, ON (*Abstract Co-Author*) Institutional Research Grant, Canon Medical Systems Corporation

PURPOSE

The diagnostic performance of dual-energy CT (DECT) and confidence level of radiologists making the diagnosis on DECT in suspected acute bowel ischemia (ABI) in comparison with conventional CT were assessed. CT viewing times for conventional CT and DECT were evaluated.

METHOD AND MATERIALS

This retrospective study included 89 patients with clinically suspected ABI, who underwent Dual-energy CT imaging over 4 years in a large teaching institution. Clinical, laboratory, operative and biopsy findings were recorded as reference standard. Two radiologists who were blinded to the reference standard independently assessed conventional CT images to look for ABI, and subsequently, assessed DECT images. Diagnosis, confidence levels and CT reading times for both conventional CT and DECT were compared. The readers expressed their confidence levels in assessing bowel ischemia on 5 point Likert scale.

RESULTS

ABI was detected in 13 patients among 89 patients with clinical suspicion. The confidence level of Reader 1 to make the diagnosis increased by one level in 51.3% after reviewing DECT images; increased by two levels in 10.2%, and remained the same in 35.9%. For Reader 2, the confidence level increased by one level in 29.2% of patients, increased by two levels in 5.5%, unchanged in 48.6%, and decreased by one level in 15.3%. The mean reading time for conventional CT by Reader 1 was 104.6 ± 57.23 sec, and the mean additional time to read DECT was 63.5 ± 38.55 sec. The corresponding CT viewing times for Reader 2 were 67.4 ± 33.39 sec, and 51.1 ± 28.99 sec, respectively.

CONCLUSION

DECT increases the confidence of radiologists in diagnosing ABI with comparable diagnostic accuracy and reasonable extra-viewing time, as opposed to interpreting conventional CT alone. Hence, DECT is a promising imaging technique for routine clinical use in suspected ABI.

CLINICAL RELEVANCE/APPLICATION

Acute Bowel Ischemia (ABI) is a clinical emergency, warranting prompt intervention or surgery, and this study aims to assess if dual-energy CT (DECT) could play a valuable role in evaluation of ABI.

SSK08-09 Non-Invasive Assessment of Liver Cirrhosis with Multiphasic Dual Energy CT Using Iodine Quantitation: Correlation with Model of End-Stage Liver Disease Score

Wednesday, Dec. 4 11:50AM - 12:00PM Room: S502AB

Participants
Domenico Mastrodicasa, MD, Stanford, CA (*Presenter*) Nothing to Disclose
Martin J. Willemink, MD,PhD, Mountain View, CA (*Abstract Co-Author*) Research Grant, American Heart Association; Research Grant, Koninklijke Philips NV; Consultant, Arterys Inc
Celina Duran, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Virginia Hinostroza, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Lior Molvin, Palo Alto, CA (*Abstract Co-Author*) Speakers Bureau, General Electric Company
Mohamed H. Khalaf, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
R. Brooke Jeffrey Jr, MD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Bhavik N. Patel, MD, Fremont, CA (*Abstract Co-Author*) Speakers Bureau, General Electric Company; Research Grant, General Electric Company

For information about this presentation, contact:

mastro@stanford.edu

PURPOSE

To determine whether contrast-enhanced multiphasic dual-energy (DE) CT iodine quantitation correlates with severity of chronic liver disease.

METHOD AND MATERIALS

This single-center, IRB-approved and HIPAA compliant retrospective study involved 28 patients with (15M; median age, 62 (58-68) years) and 22 patients without cirrhosis (8M; median age, 67 (51-75) years) who underwent a multiphasic liver protocol DECT. All three (arterial, portal venous (PVP), and delayed) phases were performed in DE mode. Patient demographics, MELD scores, and cirrhosis diagnosis were based on electronic medical records. A radiologist obtained Iodine concentration (mg I/ml) by manually placing ROIs in the caudate, left and right hepatic lobe, aorta, common hepatic artery (CHA), and portal vein (PV) on all 3 phases. ROI size and position were constant in all phases. Absolute iodine values were divided by those from the aorta for each phase to derive normalized Iodine quantitation (I). Iodine slopes (λ) were calculated as follows: Idelayed-arterial/ time(180 seconds) and Idelayed-PVP/ time(180 seconds). Slopes were correlated with MELD scores and the area under the curve of the receiver operating characteristic (AUROC) was calculated to distinguish cirrhotic and non-cirrhotic patients.

RESULTS

Cirrhotic and non-cirrhotic patients had significantly different λdelayed-PVP for caudate (λ = 1.350 vs. 2.350, P< .0001), left (λ = 1.383 vs. 2.200, P< .004), and right (λ = 1.063 vs. 1.913 , P< .0001) lobe. λdelayed-arterial were significantly different for CHA (λ = 2.450 vs. 11.250, P< .023) and PV (λ = 2.750 vs. 3.750, P= .013). A statistically significant correlation was found between MELD scores and λdelayed-PVP of caudate, left and right lobes (rho =0.340, P=.034; rho=0.393, P=.005; rho=0.368, P=.034, respectively). AUROC for caudate, left, and right lobe λdelayed-PVP in differentiating cirrhotics from non-cirrhotics were 0.794, 0.739, 0.908, respectively.

CONCLUSION

Multiphasic DECT iodine quantitation over time is significantly different between cirrhotics and non-cirrhotics and correlates with MELD score.

CLINICAL RELEVANCE/APPLICATION

Multiphasic DECT iodine quantitation could serve as a non-invasive measure of cirrhosis and disease severity with high diagnostic accuracy.

SSK09

Gastrointestinal (Colon and Appendix)

Wednesday, Dec. 4 10:30AM - 12:00PM Room: S504AB

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Gaurav Khatri, MD, Irving, TX (*Moderator*) Nothing to Disclose
Raquel O. Alencar, MD,PhD, Boston, MA (*Moderator*) Nothing to Disclose
Harmeet Kaur, MD, Houston, TX (*Moderator*) Nothing to Disclose

Sub-Events

SSK09-01 Intravoxel Incoherent Motion Diffusion-Weighted Imaging of Primary Rectal Carcinoma: Distinguish the Malignant or Benign Lymph Node

Wednesday, Dec. 4 10:30AM - 10:40AM Room: S504AB

Participants
Qiang Feng, Weifang, China (*Presenter*) Nothing to Disclose
Zhijun Ma, Qingzhou, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

fengyixiao2002@163.com

PURPOSE

The aim of this study was to evaluate the difference between the malignant or benign lymph node by IVIM and to determine the optimal parameter of IVIM.

METHOD AND MATERIALS

We retrospectively enrolled 98 patients with pathologically proven rectal adenocarcinoma. All patients underwent routine MR examination and IVIM sequence. A total of 246 lymph nodes were harvested and subjected to histological analysis. The IVIM maps were automatically generated. The t test, Mann-Whitney U test, and receiver operating characteristic curves was used for statistical analysis.

RESULTS

All IVIM parameters demonstrated the difference between metastatic lymph nodes and the normal lymph nodes (PD<0.01; PD*=0.01; Pf<0.001). For metastatic lymph nodes, f value of poorly differentiated rectal carcinoma were lower than well/moderately differentiated carcinoma, the significant difference was found (Pf=0.03). In addition, D value of mucinous carcinoma were higher than non-mucinous carcinoma (P<0.01) and D* values were on the contrary (P<0.01). D* showed a relatively higher area under the curve (AUC)(0.905) and higher sensitivity(94.48%) and specificity(85.33%) than other percentiles for differentiation of benign or malignant lymph nodes (LNs).

CONCLUSION

The IVIM parameters may distinguish between the malignant and benign lymph node during the primary staging of rectal carcinoma. D* appears to be a valid and promising parameter to indicate the quality of LNS.

CLINICAL RELEVANCE/APPLICATION

The IVIM parameters can demostrate the malignant or benign lymph node of primary staging of rectal carcinoma. D* is recommended as part of a MR study prior to tumor removal.

SSK09-02 Dual-Energy CT Colonography: Increasing Reader Performance and Confidence in a Spectral Colon Phantom

Wednesday, Dec. 4 10:40AM - 10:50AM Room: S504AB

Participants
Markus M. Obmann, MD, Basel, Switzerland (*Presenter*) Nothing to Disclose
Chansik An, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Amanda R. Schaefer, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Yuxin Sun, BS,MSc, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Judy Yee, MD, Bronx, NY (*Abstract Co-Author*) Research Grant, EchoPixel, Inc; Research Grant, Koninklijke Philips NV; Research Grant, General Electric Company
Zhen J. Wang, MD, Hillsborough, CA (*Abstract Co-Author*) Stockholder, NEXTRAST, INC; Consultant, General Electric Company
Benjamin M. Yeh, MD, Hillsborough, CA (*Abstract Co-Author*) Research Grant, General Electric Company; Consultant, General Electric Company; Author with royalties, Oxford University Press; Shareholder, Nextrast, Inc; Research Grant, Koninklijike Philips NV;

Research Grant, Guerbet SA; ;

For information about this presentation, contact:

markus.obmann@usb.ch

PURPOSE

To investigate if Dual-Energy CT (DECT) improves polyp detection compared to conventional CT (CCT) at CT Colonography (CTC) for different fecal tagging levels in an anthropomorphic phantom model.

METHOD AND MATERIALS

A 30 cm diameter colon phantom containing 60 polyps of different shapes (spherical, ellipsoid, flat) and size groups (5-9 mm; 11-15 mm) was serially filled with simulated feces tagged with 4 different iodine concentrations (1.26, 2.45, 4.88, and 21 mg I/ml). The artificial colon wall, polyps, feces and surrounding fat were tailored to match the spectral properties of human tissue. Low-dose scans (CTDIvol: 4.5 mGy) were performed on a dual-layer spectral CT with and without an additional outer 6 cm fat-ring (total diameter 42 cm). The phantom was divided into 336 segments, 276 without and 60 with polyps. Two abdominal radiologists independently reviewed CCT and DECT images (40 keV monoenergetic) images to record the presence of polyps in each segment and confidence (3-point Likert-scale.) Sensitivity and specificity between CCT and DECT were compared using McNemar's test, corresponding ROC AUCs were compared using DeLong's test; reader confidence was compared using Wilcoxon test.

RESULTS

Interrater agreement was substantial (κ=0.736). Overall sensitivity was higher at DECT than for CCT (59% versus 42%, respectively, p<0.001), including scans with the fat-ring (sensitivity: 48% vs 31%, respectively, p<0.001), while overall specificity was high for both (99.6% and 99.7%, respectively). Greater fecal tagging correlated with higher sensitivity for polyp detection both CCT and DECT (lowest vs highest tagging, 11 vs 76 % and 28 vs 85%, respectively, both p<0.001). At corresponding tagging levels, DECT showed higher sensitivity and specificity, resulting in superior ROC AUCs (p<0.003 for all levels). Reader confidence increased significantly with DECT compared to CCT (1.77 vs 1.54, p<0.001).

CONCLUSION

DECT improves polyp detection sensitivity and confidence in CTC exams, especially with low level fecal tagging. Effects were seen irrespective of polyp size or shape, and for larger phantom diameter. Study of clinical DECT colonography is warranted.

CLINICAL RELEVANCE/APPLICATION

DECT improves polyp detection sensitivity and confidence in a CTC phantom. Clinical DECT CTC studies to reduce cathartic bowel preparation or to salvage suboptimal tagged exams are warranted.

SSK09-03 Role of CT Colonography and Texture Analysis in Differentiating Sigmoid Cancer versus Chronic Diverticular Disease

Wednesday, Dec. 4 10:50AM - 11:00AM Room: S504AB

Participants
Riccardo Valletta, MD, Verona, Italy (*Presenter*) Nothing to Disclose
Niccolo Faccioli, MD, Verona, Italy (*Abstract Co-Author*) Nothing to Disclose
Matteo Bonatti, MD, Bolzano, Italy (*Abstract Co-Author*) Nothing to Disclose
Fabio Lombardo, MD, Negrar, Italy (*Abstract Co-Author*) Nothing to Disclose
Elena Santi, Verona, Italy (*Abstract Co-Author*) Nothing to Disclose
Micaela Tagliamonte, Bolzano , Italy (*Abstract Co-Author*) Nothing to Disclose
Antonello Lucarelli, Verona, Italy (*Abstract Co-Author*) Nothing to Disclose
Giancarlo Mansueto, MD, Verona, Italy (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

riccardo.valletta@gmail.com

PURPOSE

To retrospectively evaluate morphological findings of chronic diverticular disease and sigmoid carcinoma at computed tomography colonography (CTC) and to evaluate texture analysis potential in order to differentiate them.

METHOD AND MATERIALS

We included in our IRB-approved retrospective study 95 consecutive patients with histologically proven chronic diverticular disease (n = 53) or sigmoid carcinoma (n = 42). Two radiologists retrospectively analyzed CTC studies unaware of the histological diagnosis. One reader scored each exam according to presence or absence of potential discriminators (Length, Wall thickness, Shouldering phenomenon, Thickening type, Growth pattern, Diverticula, Fascia thickening, Fat tissue edema, Loco-regional lymph nodes, Mucosal pattern) and performed volumetric texture analysis on the colonic tissue in both groups.

RESULTS

The Findings that suggest carcinoma diagnosis were: absence of diverticula in the affected segment (sensitivity 87.9%; specificity 90.5%); straightened growth pattern (sensitivity 71.4%; specificity 90.9%); shouldering phenomenon (sensitivity 90.5%; specificity 81.8%); complete distortion of mucosal folds (sensitivity 95.2%; specificity 75.8%). Considering mass-like lesions, growth pattern and mucosal folds distortion lose their diagnostic value. The only morphological finding with higher diagnostic value is absence of diverticula in the examined segment; its combination with shouldering phenomenon increases carcinoma diagnosis specificity. Regarding texture analysis parameters, kurtosis (first order feature, HISTO, p<0.001), correlation (second order feature, GLCM, p=0.0037) and contrast (second order feature NGLDM, p=0.0079) resulted to be significantly different between the two groups.

CONCLUSION

Carcinoma is best differentiated from chronic diverticular disease in CTC by the absence of diverticula in the affected segment and the presence of shoulder phenomenon. Texture analysis can provide an additional tool in differentiating the two entities when

considering HISTO kurtosis, GLCM correlation and NGLDM contrast, but further studies are needed

CLINICAL RELEVANCE/APPLICATION

Distinguishing colonic carcinoma from chronic diverticular disease at CTC is fundamental due to the extremely different prognosis and treatment of the two pathologies. CTC is able to do that and texture analysis can be helpful in this diagnostic process.

SSK09-04 Use of CT Encounters to Improve Colon Cancer Screening Utilization Rates: Cross-Sectional Survey Results from the National Health Interview Survey

Wednesday, Dec. 4 11:00AM - 11:10AM Room: S504AB

Participants
Efren J. Flores, MD, Boston, MA (*Presenter*) Nothing to Disclose
Diego Lopez, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Randy C. Miles, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Avinash R. Kambadakone, MD, Boston, MA (*Abstract Co-Author*) Research Grant, General Electric Company; Research Grant, Koninklijke Philips NV
Anand K. Narayan, MD,PhD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ejflores@mgh.harvard.edu

PURPOSE

Millions of patients undergo cross-sectional imaging examinations using CT every year. These imaging encounters may represent opportunities to improve colorectal cancer screening rates with CT colonography among patients who have not received recommended colon cancer screening. Using a nationally representative cross-sectional survey, the purpose of this study was to estimate the proportion of patients who have undergone CT examinations among those who have not received recommended colon cancer screening.

METHOD AND MATERIALS

Survey respondents from the 2015 National Health Interview Survey (NHIS), a nationally representative federal cross-sectional survey, were analyzed. Participants aged 50-75 without history of colorectal cancer were included. The proportion of patients who have not received recommended colon cancer screening who underwent CT examinations was estimated. Multiple variable logistic regression analyses were performed to evaluate the association between sociodemographic characteristics and colorectal cancer screening adherence. Stata survey procedures were used with NHIS-provided sampling weights to account for complex survey sampling design and to obtain statistically valid estimates for the civilian, non-institutionalized US population.

RESULTS

13,602 survey respondents met inclusion criteria. 46.8% (45.5, 48.1) reported having ever received a CT scan and 72.1% (70.4, 73.7) of those were eligible for CRC screening. Among those who previously had CT scans, Asian race participants (OR 0.47, 95% CI - 0.31, 0.72, p = 0.001) and participants without health insurance coverage (OR 0.48, 95% CI - 0.34, 0.70, p < 0.001) had lower odds of adherence, while increasing household income (OR 1.01, 95% CI 1.00 - 1.01, p < 0.001) and education (OR 1.30, 95% CI 1.10 - 1.54, p = 0.002) were associated with higher odds of adherence. Among participants who did not receive CRC screening, 35.2% (33.3%, 37.2%) reported having a CT scan, representing an estimated 10,904,722 people across the United States.

CONCLUSION

Among patients who have not received recommended colorectal cancer screening, approximately 1 out of 3 report having undergone a CT examination.

CLINICAL RELEVANCE/APPLICATION

Radiology encounters with patients undergoing CT exams may represent opportunities to improve colorectal cancer screening rates and utilization of CT colonography across the US.

SSK09-05 Radiomics-Based LN Staging after Neoadjuvant Chemoradiotherapy in Locally Advanced Rectal Cancer by Features from the Primary Tumor and One Automatically Selected Lymph Node

Wednesday, Dec. 4 11:10AM - 11:20AM Room: S504AB

Participants
Haitao Zhu, PhD, Beijing, China (*Presenter*) Nothing to Disclose
Xiao-Yan Zhang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yan-jie Shi, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Ying-shi Sun, MD,PhD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

This study aims to predict N stage after neoadjuvant chemoradiotherapy (NCRT) by combining the features of primary tumor and the features of one lymph node (LN) selected through a radiomics approach.

METHOD AND MATERIALS

229 patients were included in this study, chronologically divided into the discovery cohort (n=183) and validation cohort (n=46). T2-weighted images were scanned in an oblique direction perpendicular to the intestinal tube with following parameters: repetition time (TR) = 5700 ms, echo time (TE) = 110 ms, echo number = 25, field of view (FOV) = 180 mm. 41 features were extracted from the primary tumor and all visible LNs delineated on both pre-NCRT and post-NCRT MRI images. Pathological N stage after excision is used as ground truth. The LN that has the minimum or maximum value for each feature is selected and combined with the features of primary tumor to construct a Radiomics model in the discovery cohort by logistic regression with L1 regularization. The model is tested in the validation cohort and compared with several models.

RESULTS

The average LN number and standard deviation for one patient is 13.4±5.1 in pre-NCRT scanning and 6.7±4.1 in post-NCRT scanning. The optimal way of LN selection is by using the maximum cluster prominence. The area under receiver operative curve (AUC) is 0.840 (95%CI: 0.778-0.890) for discovery cohort and 0.864 (95%CI: 0.731-0.947) for validation cohort. For the model that only uses tumor features, AUC is 0.580 (95%CI: 0.505-0.653) for discovery cohort and 0.669 (95%CI: 0.515-0.801) for validation cohort. For the model that uses tumor features and the LN that has the largest volume, AUC is 0.801 (95%CI: 0.736-0.856) for discovery cohort and 0.839 (95%CI: 0.701-0.931) for validation cohort. For the model that uses tumor features and average LN features, AUC is 0.741 (95%CI: 0.671-0.803) for discovery cohort and 0.539 (95%CI: 0.386-0.687) for validation cohort. For subjective evaluation, AUC is 0.650 (95%CI: 0.576-0.719) for discovery cohort and 0.756 (95%CI: 0.607-0.870) for validation cohort.

CONCLUSION

Radiomics model combining tumor features and features from LN with the maximum cluster prominence shows increased accuracy in predicting LN metastasis after NCRT for locally advanced rectal cancer (LARC) patients.

CLINICAL RELEVANCE/APPLICATION

Identification of lymph node (LN) status is crucial for assigning patients with LARC to appropriate treatments.

SSK09-06 The Diagnostic Performance of MRI for Detection of Extramural Venous Invasion in Colorectal Cancer: A Systematic Review and Meta-Analysis of the Literature

Wednesday, Dec. 4 11:20AM - 11:30AM Room: S504AB

Participants
Tae-Hyung Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sungmin Woo, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Sangwon Han, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Chong Hyun Suh, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hebert Alberto Vargas, MD, Cambridge, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

kth1205@gmail.com

PURPOSE

To perform a systematic review and meta-analysis regarding the diagnostic performance of MRI for detection of extramural venous invasion (EMVI) in patients with colorectal cancer.

METHOD AND MATERIALS

MEDLINE and EMBASE were searched up to November 9th 2018. We included diagnostic accuracy studies that used MRI for EMVI detection in patients with colorectal cancer, using pathology as the reference standard. The methodological quality was assessed using QUADAS-2. Sensitivity and specificity were pooled and plotted in a hierarchical summary receiver operating characteristics plot. Meta-regression analysis using several clinically relevant covariates were performed.

RESULTS

Fourteen studies (n = 1751 patients) were included. Study quality was generally moderate. Pooled sensitivity was 0.61 (95% CI 0.49-0.71) and specificity was 0.87 (95% CI 0.79-0.92). There was substantial heterogeneity: Cochran's Q-test ($p<0.01$), Higgins I2 (98% and 95% for sensitivity and specificity, respectively). Publication bias was present ($p = 0.01$). Higher prevalence of advanced T stage, high-resolution MRI and antispasmodic drugs were significant factors affecting heterogeneity ($p <0.01$). Location of primary tumor, preoperative treatment status, study design, definition of reference standard, magnetic field strength, and use of functional MRI sequences were not statistically significant ($p = 0.17$-0.92).

CONCLUSION

MRI demonstrates moderate sensitivity and good specificity for detection of EMVI in colorectal cancer. Using high-resolution MRI may improve diagnostic performance.

CLINICAL RELEVANCE/APPLICATION

MRI demonstrates moderate sensitivity and good specificity for detection of EMVI in patients with colorectal cancer. Preoperative MRI would benefit patients with coloretal cancer for correct staging and subsequent setting of optimal treatment. Furthremore, this study would provide rationale for future studies evaluating the role of MRI-detected EMVI without pathologic confirmation.

SSK09-07 Characteristic Radiographic Patterns of Biopsy-Proven Immune-Related Colitis in Melanoma Patients Treated with Cytotoxic T-Lymphocyte Antigen-4 (CTLA-4) Inhibitors

Wednesday, Dec. 4 11:30AM - 11:40AM Room: S504AB

Participants
Alex Ruan, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Marta Braschi Amirfarzan, MD, Burlington, MA (*Presenter*) Nothing to Disclose
Elizabeth I. Buchbinder, MD, Boston, MA (*Abstract Co-Author*) Advisory Board, Bristol-Myers Squibb Company; Advisory Board, Array BioPharma Inc; Advisory Board, Trieza; Advisory Board, Novartis AG
Patrick A. Ott, Boston, MA (*Abstract Co-Author*) Consultant, Bristol-Myers Squibb Company
Richard Thomas, MBBS, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
F. Stephen Hodi JR, MD, Boston, MA (*Abstract Co-Author*) Consultant, Bristol-Myers Squibb Company; Support, Bristol-Myers Squibb Company; Advisor, Merck & Co, Inc; Advisor, F. Hoffmann-La Roche Ltd; Support, Merck & Co, Inc; Support, F. Hoffmann-La Roche Ltd; Consultant, Novartis AG; Research support, Novartis AG; Consultant, Amgen Inc; Consultant, Merck KGaA; Consultant, sanofi-aventis Group; Consultant, Takeda Pharmaceutical Company Limited; Consultant, Bayer AG; Consultant, Pfizer, Inc; Consultant, Surface; Consultant, Compass; Stockholder, Apricity; Stockholder, Pionyr; Consultant, Aduro BioTech, Inc; Stockholder, Torque; Consultant, Verastem, Inc
Osama E. Rahma, MD, Boston, MA (*Abstract Co-Author*) Research support, Merck & Co, Inc; Speaker, Bristol-Myers Squibb

Company; Speaker, Merck & Co, Inc; Consultant, Merck & Co, Inc; Consultant, Celgene Corporation; Consultant, Five Prime; Consultant, GlaxoSmithKline plc; Consultant, GFK; Consultant, Defined Health Inc; Consultant, F. Hoffmann-La Roche Ltd; Consultant, Puretech; Consultant, Leerink Swann & Company; Consultant, PRMA Consulting ; Pending patent, "METHODS OF USING PEMBROLIZUMAB AND TREBANANIB"
Shilpa Grover, MD,MPH, Boston, MA (*Abstract Co-Author*) Editor, Wolters Kluwer nv

For information about this presentation, contact:

sgrover@bwh.harvard.edu

PURPOSE

To investigate the radiographic signature of biopsy-proven immune-related colitis in patients treated with CTLA-4 inhibitors.

METHOD AND MATERIALS

We retrospectively reviewed medical records of 692 cancer patients treated at our institution who received at least 1 course of an immune checkpoint inhibitor between 2011 and 2018. Among them, 100 (14%) had biopsy-proven colitis and of those, 97 (97%) had concomitant imaging. In order to characterize the radiographic features of colitis associated with CTLA-4 inhibitors, we limited our cohort to patients treated with a CTLA-4 inhibitor who underwent at least 1 baseline and on-treatment abdominal CT. Abdominal CTs were reviewed by a single radiologist for the presence and imaging characteristics of colitis.

RESULTS

We identified 20 patients with melanoma treated with either ipilimumab (17) or tremelimumab (3) (mean age 69 yrs) who subsequently developed biopsy-proven colitis. Of those 20 patients, 18 (90%) had radiographic evidence of colitis a mean of 14.6 wks after starting CTLA-4 therapy. Radiographic patterns noted were pancolitis (10 patients, 56%), segmental colitis (7, 39%), segmental colitis associated with diverticulosis (SCAD, 6, 33%), enterocolitis (3, 17%), and enteritis alone (1, 6%); several patients had multiple features. Most common CT features of colitis included bowel wall thickening (16 patients, 89%), fluid-filled colon (14, 78%), fat stranding (14, 78%), mesenteric vessel engorgement (12, 67%), and mucosal hyperenhancement (10, 56%). Among the 6 patients with classic SCAD pattern, 3 (50%) also had concomitant involvement of the hepatic flexure, a novel radiographic finding. Colitis prompted interruption of treatment and initiation of steroids in 6 patients and steroids/infliximab in 12 patients.

CONCLUSION

CTLA-4 inhibitor mediated biopsy-proven immune-related colitis has radiographic findings ranging from segmental colitis to pancolitis on CT. Bowel wall thickening was the most prevalent finding. A subset of patients with SCAD pattern may have a predilection for involvement of the hepatic flexure, reported here for the first time. These findings should be prospectively validated in additional cohorts.

CLINICAL RELEVANCE/APPLICATION

Given the expanding role of immune checkpoint blockade including CTLA-4 inhibition, radiologists should be aware of the imaging features of immune-related colitis.

SSK09-09 Retrospective Diagnostic Model Development and Validation Study: Differentiation of Complicated from Uncomplicated Appendicitis in Adolescents and Young Adults Using CT and Clinical Predictors

Wednesday, Dec. 4 11:50AM - 12:00PM Room: S504AB

Participants
Hae Young Kim, MD,MS, Seongnam, Korea, Republic Of (*Presenter*) Nothing to Disclose
Ji Hoon Park, MD,PhD, Seongnam, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sung Soo Lee, Seongnam-si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jong June Jeon, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Woojoo Lee, Incheon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Kyoung Ho Lee, MD, Seongnam, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

qkfmrp860329@gmail.com

PURPOSE

To develop and validate a diagnostic model comprising CT and clinical/laboratory features for differentiation of complicated from uncomplicated appendicitis.

METHOD AND MATERIALS

This retrospective study included 1153 adolescent and young adults (mean age ± standard deviation, 30 ± 8 years) with suspected appendicitis on CT. We used the data from a previous pragmatic multi-center randomized controlled trial that compared 2-mSv CT and conventional-dose CT for the diagnosis of appendicitis in 20 teaching hospitals. We included 804 patients from 12 sites for model development, and 349 patients from eight sites for external validation. The outcome of interest was complicated appendicitis (perforated or gangrenous appendicitis). Complicated appendicitis was surgically or pathologically confirmed in 300 and 121 patients in the development and validation set, respectively. We constructed diagnostic models using logistic regression from candidate predictors comprising eight CT features and 13 clinical/laboratory features. The final model was selected using the Bayesian information criterion. A simplified rule was derived at a cut-off score targeting 95% sensitivity in the development set. For external validation, sensitivity and specificity were measured in the validation set, using the detailed model and its simplified rule targeting 95% sensitivity.

RESULTS

Six predictors comprising 5 CT features (contrast-enhancement defect of the appendiceal wall, abscess, periappendiceal fat stranding, appendiceal diameter, and extraluminal air) and the percentage of segmented neutrophil were included in our model. In the validation set, the sensitivity and specificity were 95.9% (90.6%, 98.6%) and 19.3% (14.4%, 25.0%) using the detailed model; and 95% (90%, 98%) and 16% (11%, 21%) using the simplified rule.

CONCLUSION

We propose highly sensitive prediction model for complicated appendicitis, which may contribute to reducing the number of unnecessary appendectomies performed for uncomplicated appendicitis.

CLINICAL RELEVANCE/APPLICATION

For physicians who are willing to attempt conservative management of appendicitis while minimizing the risk of treatment failure, our model can be used with expected percentage of false negatives to be less than 1.5%.

Printed on: 10/29/20

SSK15

Nuclear Medicine (Gastrointestinal Oncology Nuclear Medicine and PET)

Wednesday, Dec. 4 10:30AM - 12:00PM Room: E451A

GI NM

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Amy M. Fowler, MD,PhD, Madison, WI (*Moderator*) Institutional research support, General Electric Company; Author with royalties, Reed Elsevier
Steve Cho, MD, Madison, WI (*Moderator*) Research Grant, General Electric Company; Consultant, Advanced Accelerator Applications SA;

Sub-Events

SSK15-01 Integrated Time-Of-Flight 18F-FDG PET/MRI For Assessment of Pathologic Response to Neo-Adjuvant Chemo-Radiotherapy in Borderline Resectable Pancreatic Ductal Adenocarcinoma

Wednesday, Dec. 4 10:30AM - 10:40AM Room: E451A

Awards
Trainee Research Prize - Fellow

Participants
Ishan Garg, MBBS, Rochester, MN (*Presenter*) Nothing to Disclose
Ananya Panda, MD,MBBS, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Geoffrey B. Johnson, MD,PhD, Rochester, MN (*Abstract Co-Author*) Research Grant, General Electric Company Research Grant, Pfizer Inc
Mark Truty, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Sudhakar K. Venkatesh, MD, FRCR, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Jeff L. Fidler, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Nipun Mistry, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Ajit H. Goenka, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine if parameters derived from integrated time-of-flight 18F-FDG PET/MRI correlate with pathologic response after neoadjuvant chemo-radiotherapy (CRT) in patients with borderline resectable pancreatic ductal adenocarcinoma (PDAC).

METHOD AND MATERIALS

Patients with FDG-avid (SUVmax>=4) borderline resectable PDAC on baseline PET/MRI who also underwent a post-CRT PET/MRI prior to surgical resection were included. Primary tumor SUVmax, glucose-corrected SUVmax (SUVgluc), SUVmean and volumetric PET parameters (total lesion glycolysis and metabolic tumor volume) were measured using anatomic guidance from simultaneously acquired contrast-enhanced MRI. Metabolic response on PET/MRI was correlated to histologic treatment response using College of American Pathologists grading system (path grade). Complete metabolic response (CMR) defined as FDG uptake indistinguishable from surrounding background and normalization of post-CRT CA 19-9 were evaluated as surrogates of path grade 1/0 (marked or complete response).

RESULTS

34 patients (52.9% males; mean age: 62-years, range 23-80) were included. Follow-up duration was 17.6±5.7 months (mean ± SD). Pathologic response grades were either 1/0 (n=13) or 2/3 (n=21). Complete metabolic response on post-CRT PET/MRI was observed in 20 patients - 12 with path grades 1/0, and 8 with path grade 2. CMR was superior to normalization of post-CRT CA 19-9 as a surrogate for path grade 1/0 (sensitivity 92.3 v/s 66.7%; specificity 61.9 v/s 18.2%; PPV 60 v/s 40%; NPV 92.9 v/s 40%; AUC 0.77 v/s 0.42; P <0.05). Using ROC analysis, a relative change of >=50% in SUVgluc had 100% sensitivity, 61.9% specificity, 61.9% PPV and 100% NPV for path grade 1/0.

CONCLUSION

Qualitative and quantitative parameters derived from FDG PET/MRI correlate with pathologic response after neoadjuvant CRT and had better performance than normalization of post-CRT CA 19-9 as a surrogate for path grade 1/0.

CLINICAL RELEVANCE/APPLICATION

Qualitative and quantitative parameters derived from 18F-FDG PET/MRI show promise for assessment of pathologic response to CRT in patients with borderline resectable PDAC and merit evaluation in larger studies.

SSK15-02 18F-FDG PET-MR Enterography in Predicting Histological Active Disease in Ulcerative Colitis: A Randomized Controlled Trial Using Nancy Index

Wednesday, Dec. 4 10:40AM - 10:50AM Room: E451A

Participants

Yan Li, Essen, Germany (*Presenter*) Nothing to Disclose
Benedikt M. Schaarschmidt, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Lale Umutlu, MD, Essen, Germany (*Abstract Co-Author*) Consultant, Bayer AG
Michael Forsting, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Aydin Demircioglu, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Anna K. Koch, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Ole Martin, Duesseldorf, Germany (*Abstract Co-Author*) Nothing to Disclose
Ken Herrmann, Essen, Germany (*Abstract Co-Author*) Co-founder, SurgicEye GmbH Stockholder, SurgicEye GmbH Consultant, Sofie Biosciences Consultant, Ipsen SA Consultant, Siemens AG Research Grant, Advanced Accelerator Applications SA Research Grant, Ipsen SA
Hendrik Juette, Bochum, Germany (*Abstract Co-Author*) Nothing to Disclose
Andrea Tannapfel, Bochum, Germany (*Abstract Co-Author*) Nothing to Disclose
Jost Langhorst, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yan.li@uk-essen.de

PURPOSE

To evaluate the diagnostic performance of PET-MR enterography in detecting histological active inflammation in patients with ulcerative colitis and the impact of bowel purgation on diagnostic accuracies of PET-MR parameters.

METHOD AND MATERIALS

Fifty patients were enrolled in this randomized controlled trial (clinicaltrials.gov [NCT03781284]). 40 patients were randomized in two study arms, in which bowel purgation was performed either before or after PET-MR enterography. All patients underwent ileocolonoscopy with mucosal biopsies after PET-MR within 24h. Diagnostic performance of MR morphological parameters (MRmorph), diffusion-weighted imaging (DWI) and PET in detecting histological inflammation determined by Nancy index was compared with each other and between study arms. Correlation between PET and histological inflammatory severity was calculated.

RESULTS

In study arm without previous bowel purgation, SUVmax ratio of bowel segment (relative to SUVmax of the liver) facilitated the highest specificity and diagnostic accuracy compared to MRmorph and DWI. Bowel cleansing led to markedly increased metabolic activity of bowel segments, resulting in significantly reduced specificity of PET compared to study arm without purgation (0.808 vs. 0.966, $p = 0.007$, respectively). Inter-observer concordance for assessing MRmorph was clearly increased after bowel cleansing (Cohen's κ: 0.847 vs. 0.665, $p = 0.013$, respectively), though diagnostic performance of MRmorph was not significantly improved. Our findings suggested that the change of metabolic status was mainly associated with the grade of neutrophil infiltrate and less dependent on chronic infiltrate.

CONCLUSION

PET-MR enterography was an excellent non-invasive diagnostic method in the assessment of ulcerative colitis without the need of previous bowel purgation.

CLINICAL RELEVANCE/APPLICATION

SUVmaxRatio was a reliable parameter facilitating best diagnostic operating characteristics in predicting histological active disease in patients with ulcerative colitis and no previous bowel purgation was needed for PET-MR.

SSK15-03 CT-Attenuation and FDG Uptake of Visceral Adipose Tissue Can Predict the Risk of Peritoneal Recurrence in Gastric Cancer Patients after Curative Surgical Resection

Wednesday, Dec. 4 10:50AM - 11:00AM Room: E451A

Participants
Jeong Won Lee, MD,PhD, Incheon, Korea, Republic Of (*Presenter*) Nothing to Disclose
Sang Mi Lee, Cheonan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

CT-attenuation and FDG uptake of adipose tissue have been used as imaging parameters that reflect qualitative characteristics of adipose tissue. Given that gastric cancer grows in an adipose tissue-dominated environment, gastric cancer might have interaction with visceral adipose tissue (VAT). The purpose of this study was to investigate the prognostic significance of CT-attenuation and FDG uptake of VAT to predict recurrence-free survival (RFS), peritoneal RFS and overall survival (OS) in patients with advanced gastric cancer (AGC).

METHOD AND MATERIALS

We retrospectively enrolled 117 patients with AGC who underwent staging FDG PET/CT and subsequent curative surgical resection. CT-attenuation and FDG uptake (SUV) of VAT and maximum FDG uptake of primary tumor (SUVmaxT) were measured from PET/CT images. The relationship of VAT attenuation and SUV with clinico-histopathologic factors and survival was assessed.

RESULTS

There was a significant positive correlation between VAT attenuation and SUV ($p<0.001$, $r=0.799$). In correlation analyses, both VAT attenuation and SUV showed significant positive correlations with T stage, tumor size, and platelet-to-lymphocyte ratio ($p<0.05$), and patients who died during follow-up had significantly higher VAT attenuation and SUV than those who survived ($p<0.05$). Patients with high VAT attenuation and SUV showed significantly worse RFS, peritoneal RFS, and OS than those with low values ($p<0.05$). On multivariate survival analysis, VAT attenuation and SUV were remained as significant predictors for peritoneal RFS and OS after adjusting age, sex, tumor stage, and SUVmaxT ($p<0.05$).

CONCLUSION

CT-attenuation and FDG uptake of VAT on staging FDG PET/CT were correlated with tumor characteristics and were significant independent predictive factors for peritoneal RFS and OS in patients with AGC.

CLINICAL RELEVANCE/APPLICATION

The qualitative characteristics of visceral adipose tissue measured on FDG PET/CT could be used to predict the risk of periteoneal recurrence in patients with advanced gastric cancer after surgical resection.

SSK15-04 Standardized Uptake Values on 68Ga-DOTATATE PET/CT Predict Response to Somatostatin Analog Therapy in Gastroenteropancreatic Neuroendocrine Tumors

Wednesday, Dec. 4 11:00AM - 11:10AM Room: E451A

Participants
Hwan Lee, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose
Jennifer R. Eads, Philadelphia, PA (*Abstract Co-Author*) Consultant, Lexicon Pharmaceuticals, Inc; Spouse, Employee, Bristol-Myers Squibb Company
Daniel Pryma, MD, Philadelphia, PA (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, 511 Pharma; Research Grant, Progenics Pharmaceuticals, Inc; Research Consultant, Progenics Pharmaceuticals, Inc; Research Consultant, 511 Pharma; Research Consultant, Actinium Pharmaceuticals, Inc; Research Consultant, Nordic Nanovector ASA

For information about this presentation, contact:

Hwan.Lee@pennmedicine.upenn.edu

PURPOSE

68Ga-DOTATATE PET/CT provides a quantitative measure of tumor somatostatin receptor status in gastroenteropancreatic neuroendocrine tumors (GEP-NETs). We examined the ability of standardized uptake values (SUVs) on 68Ga-DOTATATE PET/CT to predict response to somatostatin analog (SSA) therapy.

METHOD AND MATERIALS

The medical records of 108 consecutive patients with grade 1-2 GEP-NETs on SSA monotherapy who received 68Ga-DOTATATE PET/CT scans at a single institution were reviewed to obtain baseline characteristics, 68Ga-DOTATATE SUVmax, and progression-free survival (PFS) data. A receiver operating characteristic curve was constructed to determine the optimal SUVmax cutoff for stratification. PFS in the high vs. low SUVmax groups was compared with Kaplan-Meier survival analysis. The effects of baseline characteristics and SUVmax on PFS were examined with univariate and multivariate Cox regression.

RESULTS

SUVmax was significantly higher ($p<0.001$) in pancreatic compared to gastrointestinal NETs, but did not vary with other baseline clinical, pathologic, and laboratory characteristics. Median clinical follow-up was 16 months, and PFS at 6, 12, and 18 months was 91 ± 3%, 80 ± 4%, and 61 ± 6%, respectively. The best SUVmax cutoff of 18.35 from ROC analysis yielded sensitivity and specificity of 39% and 98%, respectively, for disease progression by 12 months (area under the curve=0.66). The low SUVmax group showed significantly shorter PFS compared to the high SUVmax group ($p<0.0001$) with median of 6.6 months vs. >24 months, which was reproduced in a subgroup analysis of 30 SSA naïve patients ($p<0.05$). On univariate analysis, high tumor grade, Ki-67, and mitotic index, as well as low SUVmax and no prior SSA therapy, were identified as predictors of early treatment failure. Only low SUVmax remained statistically significant on multivariate analysis with hazard ratio of 6.85. (95% CI: 2.10-22.34). In a subgroup analysis of 46 grade 2 patients, short PFS on SSA was again predicted by SUVmax<18.35 ($p<0.01$), but not with the Ki-67 cutoff value of 10% ($p=0.38$).

CONCLUSION

Low SUVmax on 68Ga-DOTATATE PET/CT independently predicts early failure on SSA monotherapy in grade 1-2 GEP-NET patients with high specificity.

CLINICAL RELEVANCE/APPLICATION

Based on 68Ga-DOTATATE PET/CT, clinicians can better inform patients on the expected benefit of SSA therapy, especially when access to SSA is difficult, and offer proactive discussion on alternatives.

SSK15-05 68Ga-DOTATATE PET/CT Parameters for the Early Prediction of Response to Peptide Receptor-Mediated Radionuclide Therapy (PRRT) for Metastatic Neuroendocrine Tumors (NET)

Wednesday, Dec. 4 11:10AM - 11:20AM Room: E451A

Participants
Ur Metser, MD, FRCPC, Toronto, ON (*Presenter*) Nothing to Disclose
Reut Anconina, MD, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Douglas Hussey, BSC,RT, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Ravi M. Mohan, MD, DPhil, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
David Green, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Amy Liu, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
James Brierley, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
David Laidley, MD, London, ON (*Abstract Co-Author*) Nothing to Disclose
Sten Myrehaug, MD,FRCPC, Toronto, ON (*Abstract Co-Author*) Travel support, Ipsen SA Travel support, Novartis AG Speaker, Novartis AG
Rosalyn Juergens, Hamilton, ON (*Abstract Co-Author*) Nothing to Disclose
Rebecca Wong, Toronto , ON (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ur.metser@uhn.ca

PURPOSE

To determine whether change in 68Ga-DOTATATE (DT) uptake at tumor sites is predictive of early response to PRRT. A secondary aim was to determine whether DT uptake in reference tissues changes after first cycle of PRRT (C1).

METHOD AND MATERIALS

There were 36 patients (20 men, 16 women; mean age, 60 yrs) with metastatic well-differentiated NETs (Ki67<30%, median Ki67, 6.6) being considered for PRRT who underwent baseline & follow-up DT PET after C1. SUVmax in reference tissues (mediastinal blood pool, liver & spleen) were recorded at baseline and after C1. Response to therapy at 4 months post 4th cycle of PRRT, assessed by RECIST 1.1, was available for 28 patients (mean time to response assessment, 10.9 mo; range 6-16). SUVmax & SULpeak were recorded in <=5 marker lesions per patient (<= 2 per organ). Response to therapy was compared to SUVmax & SULpeak at baseline, change in SUVmax and SULpeak after C1, and change in ratio of average SUVmax/ SULpeak of tumor to liver and spleen.

RESULTS

At baseline and after C1, mean SUVmax in blood pool, liver and spleen were 1.45 and 1.42 (-0.7%); 5.2 and 5.8 (+13%); and 16 and 19.4 (+28.4%), respectively. There were 15/28 (53.6%) patients with stable disease (SD), 10/28 (35.7%) with partial response (PR) and 3/28 (10.7%) with progressive disease (PD). The most predictive parameters for response were baseline SUVmax & change in SUVmax/SULpeak ratio of tumor/spleen. Baseline SUVmax for SD, PR and PD was 43.8 (range: 13.5-111.2), 43.3 (range: 11-137.7) & 26.2 (range: 16.5 - 40.2), respectively. Change in SUVmax ratio of tumor/spleen for SD, PR and PD was -24.2% (range: 11.2 [-77.1]), -33.5% (range: 7.8-[-70.8]) & -13.3% (range: 0.8-[-39.6]), respectively. Change in SULpeak ratio of tumor/spleen for SD, PR and PD was -24.4% (range: 19.9-[-76.9]), -36% (range: 0.7-[-84.8]) & -7.8% (range: 19.2-[39.3]), respectively.

CONCLUSION

There is generally an SUV increase in liver & spleen after C1, with little change in blood pool activity. Although there is significant overlap in measured parameters, likely limiting utility of early prediction of response on an individual basis, lower SUVmax at baseline and smaller decrease in SUVmax/ SULpeak tumor to spleen ratio were the most predictive parameters for early disease progression.

CLINICAL RELEVANCE/APPLICATION

There is significant overlap in measured DT-PET parameters, likely limiting utility of early prediction of response on an individual basis.

SSK15-06 Diffusion-weighted MRI (DWI) and 68Ga-DOTATATE PET/CT: Comparison of Both Modalities in Assessment of Tumor Response of Hepatic Metastases of Primary Neuroendocrine Tumor (NET) Undergoing Selective Internal Radiotherapy with 90Yttrium-microspheres

Wednesday, Dec. 4 11:20AM - 11:30AM Room: E451A

Participants
Maria Ingenerf, MD, Munich, Germany (*Presenter*) Nothing to Disclose
Laura Kaiser, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Adrian Curta, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Homeira Karim, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Harun Ilhan, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose
Jens Ricke, MD,PhD, Berlin, Germany (*Abstract Co-Author*) Research Grant, Sirtex Medical Ltd Research Grant, Bayer AG
Christine Schmid-Tannwald, MD, Munich, Germany (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare ADC values of DWI and SUV of 68Ga-DOTATATE PET/CT in assessing treatment response in patients with liver metastases of primary NET following SIRT.

METHOD AND MATERIALS

30 patients with 80 target liver metastases of primary NET who underwent abdominal MRI with DWI and 68Ga-DOTATATE PET/CT before and after SIRT were included. Tumor size, mean ADC values of the lesions and normal liver, intralesional SUVmax and SUV mean, tumor to spleen ratio (T/S ratio), and tumor to liver ratio (T/L ratio) were measured. Tumor response to radioembolization was categorized with respect to Response Evaluation Criteria in Solid Tumors v1.1 (RECIST) on follow-up examination.

RESULTS

67/80 metastases were categorized as stable disease (SD) and 13/80 metastases as partial remission (PR). Intralesional ADCmin and ADC mean increased significantly ($p < 0.006$) in the group of PR and SD with a significant higher increase of ADCmin values in the PR group (54,1 ± 14,6 % vs. 24 ± 4,9 %, $p = 0,02$) before and after SIRT. Currently used SUV measurements showed significant decrease in the PR group (SUV max, SUVmean, T/S ratio and T/L ratio), whereas only SUV max, SUVmean, T/S ratio (max/max) decrease significantly in the SD group. Using ROC curves, SUVmean was found the best metric (AUC 0.75), however similar results were found for ADCmin (AUC 0.7).

CONCLUSION

SUV measurements of 68Ga-DOTATATE PET/CT but also ADC values on DW-MRI seem to represent a valuable, functional maker for evaluation of response to SIRT treatment of hepatic metastases in patients with primary NET and may help in assessing further therapeutic strategies.

CLINICAL RELEVANCE/APPLICATION

DW-MRI appears similar to 68Ga-DOTATATE PET/CT for quantitative response assessment in patients with hepatic metastases of NET and may be used to guide further management of patients who undergo SIRT.

SSK15-07 Tumor Volume Remains the Most Important Variable When Considering Radiomic Feature Analysis in Anal Cancer

Wednesday, Dec. 4 11:30AM - 11:40AM Room: E451A

Participants
Joe Mercer, BMBCh, BMedSc, Bolton, United Kingdom (*Presenter*) Nothing to Disclose
Histesh Mistry, Manchester, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

Prakash Manoharan, MRCP, FRCR, Manchester, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Thomas Westwood, MBBS, Manchester, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Sahithi Nishtala, MBBS,FRCR, Newcastle under Lyme, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Azadeh Taheri, Manchester, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Andrew Renehan, MRCS,PhD, Manchester, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Mark Saunders, M20 4Bx , United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Rohit Kochhar, MD, Manchester, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

joseph.mercer@christie.nhs.uk

PURPOSE

Anal squamous cell carcinoma is a rare disease and most cases can be effectively with chemoradiotherapy. However if locoregional relapse occurs, outcomes following surgical salvage are often poor. Novel biomarkers have the potential to help predict response to treatment and select patients for appropriate follow up pathways based on risk of relapse. We aimed to explore the potential of pre-treatment PET-CT radiomic features in predicting locoregional failure and survival in these patients.

METHOD AND MATERIALS

257 consecutive patients between Jan 2012 and Jan 2018 underwent staging PET-CT. Clinical outcomes were overall survival (OS) and locoregional relapse. Radiomic features (RFs) comprising conventional PET and CTparameters, texture and shape features were extracted using LifeX software. Unsupervised learning, usingPrinicipal Components Analysis, on those parameters was then performed to generate clusters of patients. Clinical variables and endpoints were then assessed across the clusters generated. In addition, supervised learning, using elastic net regularisation, was also performed. Multivariable clinical risk prediction models, built using standard clinical parameters, with/without RFs were assessed using concordance probability estimate (CPE), adjusted R-squared (R2) and likelihood ratio-test statistic (LRT).

RESULTS

Unsupervised learning highlighted that: (1)many of the RFs correlated to tumour size; (2) patient clusters using RFs correlated with T-Stage and MRI size thus tumour volume. The final multivariable risk prediction model with RFs contained one textural and one volume-based PET parameter (CPE = 0.76, R2= 0.17, LRT = 36.7), which performed marginally better than a clinical model using tumour volume (CPE = 0.75, R2=0.14, LRT = 30.0).

CONCLUSION

Survival prediction models were enhanced by a textural feature and a volume-specific parameter identified using supervised learning. Primary tumour size remains the most important factor in predicting outcome. Challenges in accurate assessment of lesion size are well known on MRI, tumour volume can be easily assessed with appropriate PET-CT reporting software and this information should be considered in routine reporting and prediction modelling.

CLINICAL RELEVANCE/APPLICATION

Improvements in risk stratification may avoid excessively intense follow up protocols while ensuring early diagnosis of locoregional failure and the best chance of successful salvage.

SSK15-08 Intratumoral Metabolic Heterogeneity and Other Quantitative 18F-FDG PET/CT Parameters for Prognosis Prediction in Esophageal Cancer

Wednesday, Dec. 4 11:40AM - 11:50AM Room: E451A

Participants
Akilan Gopal, Dallas, TX (*Presenter*) Nothing to Disclose
Yin Xi, PhD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose
Rathan M. Subramaniam, MD,PhD, Dunedin, New Zealand (*Abstract Co-Author*) Nothing to Disclose
Daniella F. Pinho, MD, Dallas, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

daniella.pinho@utsouthwestern.edu

PURPOSE

To evaluate the impact of intratumoral metabolic heterogeneity and other quantitative FDG PET/CT parameters for predicting patient outcomes in esophageal cancer.

METHOD AND MATERIALS

This IRB and HIPPA complaint retrospective study included a total of 71 patients with biopsy proven adenocarcinoma or squamous cell carcinoma of the esophagus who had a FDG PET/CT for initial staging. Automated gradient-based segmentation method was used to assess the primary tumor standardized uptake value maximum and peak (SUV max and SUV peak), metabolic tumor volume (MTV) and metabolic intratumoral heterogeneity index, calculated as the area under cumulative SUV-volume histograms (AUC-CSH), with lower AUC-CSH indexes corresponding to higher degrees of tumor heterogeneity. Patient's demographics and tumor staging were also collected. Median follow up time was 28.2±30.3 months. Overall survival (OS) and progression free survival (PFS) were calculated using univariate cox regression with the adjustment of age, gender, staging, treatment and histological grade. All pet measurements were normalized and the hazard ratios change was equivalent to one standard deviation.

RESULTS

The patients' mean age was 64±10.3 years and there were 6 patients with stage I, 11 with stage II, 31 with stage III, 21 with stage IV disease, and 2 with unknown staging. Median survival was 16.1 months. Forty-six patients died and 15 were alive as of the end of the study (for 10 patients no recent information on survival was available). Eighteen patients had recurrence as of the end of the study. Higher MTV was significantly associated with reduced PFS for every standard deviation increase (HR=0.193, 95% CI=0.052-0.711, p=0.0134). Higher AUC-CSH (lower tumor heterogeneity, homogeneous tumor) was significantly associated with increased PFS for every standard deviation increase in the area under the curve (HR=10.779, 95% CI=1.306-88.957, p=0.0272).

CONCLUSION

There was a significant association of MTV and tumor heterogeneity with progression free survival for patients with esophageal cancer.

CLINICAL RELEVANCE/APPLICATION

FDG PET/CT quantitative parameters, particularly intramural metabolic heterogeneity, can provide prognostic information on initial staging scan, potentially leading to a more personalized approach for patient's treatment.

SSK15-09 Early Utilization of SPECT/CT to Improve Localization and Reduce Time to Diagnosis and Intervention in Acute Gastrointestinal Bleeding

Wednesday, Dec. 4 11:50AM - 12:00PM Room: E451A

Participants
Gaurav Gadodia, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Venkata Reddannagari, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Karunakaravel Karuppasamy, MD,FRCR, Westlake, OH (*Abstract Co-Author*) Nothing to Disclose
Priyesh J. Patel, MD, Lakewood, OH (*Abstract Co-Author*) Nothing to Disclose
Ram Kishore R. Gurajala, MBBS, FRCR, Beachwood, OH (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ggadodia7@gmail.com

PURPOSE

Approximately 2% of the admissions to the emergency department are for acute GIB, with 1 in 4 requiring immediate attention. Planar scintigraphy using Tc-99m tagged red blood cells (Tc-99m RBCs) is used as an ideal first line diagnostic option in suspected GIB due to being non-invasive and having a very high sensitivity. However, due to this high sensitivity, it is often the case that patients with positive or equivocal Tc-99m RBC scans have negative findings on CT angiography and/or catheter based angiography. These patients that continue to bleed ultimately require provocative angiograms or invasive procedures like surgery, which are risky and often also negative. This is due to a combination of low confidence of interpretation and poor localization of planar scintigraphy. We hypothesized that by utilizing hybrid SPECT/CT in cases of suspected GIB, we would be able to improve confidence of interpretation and localization of the bleed, and this was tested and proven in our institution. Yet, while we found a high negative predictive value of adding SPECT/CT, positive predictive value was still low. As it is well known that the sooner a bleed is identified, the higher chances are of successful treatment, we proposed a new protocol in which SPECT/CT is utilized earlier. Thus, the purpose of this report is to evaluate if a change in imaging protocol with early utilization of SPECT/CT can improve localization of acute GIB and decrease time to intervention, and/or eliminate unnecessary procedures.

RESULTS

In our retrospective analysis, 49 patients who underwent planar scintigraphy and hybrid SPECT/CT for suspected acute non-variceal GIB were included. 28 of them had positive studies on nuclear imaging (planar and SPECT/CT), while 21 were negative. For confidence of interpretation, of the 20 patients that were deemed "equivocal" on planar imaging, 13 were found to be negative and 7 positive on hybrid SPECT/CT. For localization, only 6 of the 28 positive patients had a bleed that was accurately localized on planar imaging, while all 28 were accurately localized on SPECT/CT. Finally in terms of outcomes, of the 28 patients with positive studies on nuclear medicine imaging, only 6 were found to be positive on angiography or endoscopy (PPV: 21.4%). However, all 21 patients who were negative on SPECT/CT were also negative on angiography or endoscopy (NPV: 100%). In our limited experience with the new protocol in 4 cases, time to diagnosis and/or intervention has been reduced by 50%.

CONCLUSION

Our retrospective analysis previously showed that SPECT/CT improves confidence of interpretation, localization, and ultimately outcomes in the diagnosis of GIB. While the PPV of 21.4% is low, it is still higher than planar scintigraphy alone, and likely is mostly due to slow or intermittent GI bleeding that is detected by SPECT/CT but not brisk enough to be seen on subsequent testing. On the other hand, our analysis demonstrated a 100% NPV, which can be utilized to avoid further unnecessary and possibly invasive or risky tests. Furthermore, SPECT/CT eliminated "equivocal" findings which are often reported on planar scintigraphy alone, and allowed for more accurate localization in all positive cases. Due to these findings and the fact that the initial flow phase of planar scintigraphy (first minute) is comparable to the first order angiographic arterial phase, we proposed that any tests that were positive or equivocal in that first minute should have their planar imaging stopped and go directly to SPECT/CT. Thus, as opposed to 60 minutes of planar testing, these higher risk cases would have SPECT/CT imaging completed within 30 minutes of tagged RBC injection. Any that were negative on SPECT/CT would not need further provocative or invasive testing, while those that were positive would proceed directly to angiography. In our limited experience of our first 4 patients in which we have implemented this protocol, definite diagnosis (in negative cases) or intervention (in positive cases) was achieved at least 50% faster (30 minutes vs. 60+ minutes for planar plus additional SPECT/CT). Based on our findings, we propose a similar protocol be implemented in centers where GIB are evaluated and treated to improve time to diagnosis or intervention, and eliminate any unnecessary testing.

METHODS

Retrospective analysis from 2001-2014 of patients with suspected non-variceal GIB who underwent planar tagged RBC scintigraphy and hybrid SPECT/CT prior to angiogram or endoscopy/colonoscopy. Data on confidence of interpretation, localization, and outcomes were collected and analyzed. Based on the results, a new protocol was implemented at our institution as follows: all patients in whom GIB is suspected, the planar scintigraphic images are watched in the flow phase (first minute), and if there is a definite positive, probable positive, or equivocal finding, the study is stopped and a SPECT/CT is performed.

GIS-WEA

Gastrointestinal Wednesday Poster Discussions

Wednesday, Dec. 4 12:15PM - 12:45PM Room: GI Community, Learning Center

MK GI

AMA PRA Category 1 Credit ™: .50

Participants

Dmitriy G. Akselrod, MD, Charlotte, VT (*Moderator*) Nothing to Disclose

Sub-Events

GI351-SD-WEA1 Prediction of Pancreatic Atrophy after Steroid Therapy in Autoimmune Pancreatitis Using Extracellular Volume Fraction in Contrast-Enhanced Computed Tomography

Station #1

Participants
Keitaro Sofue, MD, Kobe, Japan (*Presenter*) Nothing to Disclose
Takeru Yamaguchi, Kobe, Japan (*Abstract Co-Author*) Nothing to Disclose
Atsuhiro Masuda, Kobe, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasutaka Yamada, Kobe, Japan (*Abstract Co-Author*) Nothing to Disclose
Yushi Tsujita, Kobe, Japan (*Abstract Co-Author*) Nothing to Disclose
Eisuke Ueshima, Kobe, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshiko Ueno, MD, PhD, Kobe, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomonori Kanda, Kobe, Japan (*Abstract Co-Author*) Nothing to Disclose
Munenobu Nogami, MD, PhD, Kobe, Japan (*Abstract Co-Author*) Nothing to Disclose
Takamichi Murakami, MD, PhD, Osaka, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

keitarosofue@yahoo.co.jp

PURPOSE

In autoimmune pancreatitis (AIP), pancreatic atrophy after steroid therapy is related to deterioration of glucose tolerance. The purpose of this study was to examine whether extracellular volume fraction (fECV) in contrast-enhanced computed tomography (CE-CT) can predict pancreatic atrophy after steroid therapy in AIP.

METHOD AND MATERIALS

This IRB-approved retrospective study included 45 patients (35 men, 10 women; mean age, 64 years) with AIP who underwent CE-CT pre- and post-steroid therapy. Absolute enhancements (in Hounsfield units, HU) of the pancreatic parenchyma (ΔHUpanc) and aorta (ΔHUaorta) were measured on between precontrast and equilibrium phase images. The fECV was calculated using the following formula: fECV (%) = ΔHUpanc/ΔHUaorta × (100 - hematocrit [%]). Pancreatic volume was also measured in CE-CT before (Volpre) and after (Volpost) treatment, and atrophy rate was calculated. The fECV was correlated with rate of atrophy using the Spearman's rank correlation. The Mann-Whitney's U test was used to compare the volumetric values of the pancreas between patients with deterioration of glucose tolerance and those without. Diagnostic performance of the Volpost for the prediction of deterioration of glucose tolerance was evaluated by using receiver operating characteristic (ROC) curve analysis. Sensitivity and specificity were calculated using estimated optimal cutoff values.

RESULTS

The fECV ranged from 19.6 to 61.0% (mean, 41.4±10.4%). The mean Volpre was significantly larger than the Volpost (53.1±18.5 cm3 vs. 30.9±14.2 cm3, $P<.001$). The fECV was moderately correlated with atrophy rate ($\rho=0.586$, $P<.001$). The patients with deterioration of glucose tolerance had significantly smaller amount of the Volpost ($P=.001$) and higher atrophy rate ($P=.002$) than those without, whereas no difference was observed with regard to the Volpre ($P=.146$). Area under the ROC curve showed 0.834 for the diagnosis of deterioration of glucose tolerance, and the Volpost of 22.7 cm3 yielded 81.8% sensitivity (9/11) and 85.3% specificity (29/34).

CONCLUSION

The fECV measured from CE-CT can predict pancreatic atrophy after steroid therapy and post-treatment pancreatic volume is associated with deterioration of glucose tolerance.

CLINICAL RELEVANCE/APPLICATION

Extracellular volume fraction can predict pancreatic atrophy after steroid therapy in AIP, which can be used to consider early treatment for diabetes or alternative use of immunomodulatory agent.

GI352-SD-WEA2 Multiparametric Assessment of Microvascular Invasion in Hepatocellular Carcinoma Using Gadoxetic Acid-Enhanced MRI

Station #2

Participants
Akihiro Nishie, MD, Fukuoka, Japan (*Presenter*) Nothing to Disclose
Yoshiki Asayama, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose

Yasuhiro Ushijima, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomohiro Nakayama, MD, PhD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yukihisa Takayama, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yuichiro Kubo, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Keisuke Ishimatsu, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomoharu Yoshizumi, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Junki Maehara, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Microvascular invasion (MVI) is one of the important prognostic factors in hepatocellular carcinoma (HCC). Only a single MR finding suggestive of MVI is insufficient to predict it preoperatively. The purpose of this study was to elucidate how precisely MVI can be predicted using multiparametric assessment of gadoxetic acid-enhanced MRI.

METHOD AND MATERIALS

Three hundred and three patients with 311 hypervascular HCCs (>= 1cm) who underwent surgery and preoperative gadoxetic acid-enhanced MRI were enrolled. Group A (Training set) consists of 162 HCCs in 158 patients who underwent MRI at 1.5T (including 48 HCCs with MVI), while Group B (Validation set) 149 HCCs in 145 patients at 3.0T (including 38 HCCs with MVI). Using Group A, nine kinds of MR findings for predicting MVI including tumor diameter were compared between HCCs with and without MVI by univariate analysis, followed by multiple logistic regression analysis when limited to significant MR findings for univariate analysis. Using significant MR findings by multiple logistic regression analysis a predictive formula for diagnosing MVI was obtained. For Group B, the diagnostic performance of this predictive formula was again investigated.

RESULTS

Three MR findings were significantly associated with MVI after multivariate analysis. They included tumor diameter (D), tumor hypointensity on the portal phase (THP) and peritumoral hypointensity in the hepatobiliary phase (PHH). The probability of MVI (p) = 1 / {1+exp (4.1869 - 0.1937 x D - 2.0601 x THP - 2.3423 x PHH)}, where 1 or 0 was substituted in THP and PHH according to the presence of them. When (p) was more than 0.5, the tumor was defined as positive MVI. Diagnostic performance of this formula for Group A was sensitivity 66.7%, specificity 91.2%, and accuracy 84.0%, while that for Group B was sensitivity 65.8%, specificity 88.3%, and accuracy 82.6%.

CONCLUSION

MVI may be predicted by multiparametric assessment of gadoxetic acid-enhanced MRI quite precisely and with good reproducibility.

CLINICAL RELEVANCE/APPLICATION

(dealing with clinical practice of HCC) The MR prediction of MVI contributes to clinical decision of treatment and follow-up strategies and may enable preoperative prediction of a patient's prognosis.

GI353-SD-WEA3 Metabolic Alterations Associated with Development of Hepatocellular Carcinoma in Patients with Hepatitis-Induce Liver Cirrhosis: Effect of Aging and Enzymatic Activity

Station #3

Participants
Joon Young Park, Jeollanam-do, Korea, Republic Of (*Presenter*) Nothing to Disclose
Sang Soo Shin, MD, Gwangju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sung Mo Kim, Jellanamdo, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jong Eun Lee, Gwangju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Chung Man Moon, Gwangju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yong-Yeon Jeong, MD, Gwangju, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

kjradsss@gmail.com

PURPOSE

To quantify the hepatic metabolites of normal control (NC), liver cirrhosis (LC), cirrhotic liver with hepatocellular carcinoma (CLH) and hepatocellular carcinoma (HCC) using in vivo proton magnetic resonance spectroscopy (1H-MRS) with a long echo-time (TE) and asses their associations with aging and enzymatic activity.

METHOD AND MATERIALS

Thirty patients with LC, 30 cirrhotic patients with HCC, and 30 NCs were included in this study. Liver cirrhosis in all patients were attributable to hepatitis B and C virus. 1H-MRS measurements were performed on a localized voxel of liver parenchyma and HCC using a 3-T MR scanner to compare the differences in hepatic metabolites among four groups. The differential metabolite levels and values of serum biochemistry among the four groups were analyzed using analysis of covariance (ANCOVA) with adjustments for age and gender with Tukey's post-hoc test at $P < 0.05$. A mediation analysis was used to assess the association between ages and cellular metabolite levels with the mediation effect of serum enzymatic activities. In addition, a receiver operating characteristics (ROC) curve analysis was conducted to evaluate the diagnostic performance of 1H-MRS to predict the development of HCC in patients with hepatitis-induced cirrhotic liver.

RESULTS

The levels of lactate+triglyceride (Lac+TG) and choline (Cho) were significantly different between LC and HCC, and between CLH and HCC. Also, Lac+TG and Cho levels were positively correlated with serum lactate dehydrogenase (LDH) and alkaline phosphatase (ALP) activities, respectively. The total effect of patients' age on Lac+TG alteration was significant, and was fully mediated by LDH levels in LC, CLH, and HCC groups. In cirrhotic patients, the AUC to distinguish HCC from LC was 1.00 (95% CI; 0.94-1.00) for Lac+TG, and 0.88 (95% CI; 0.76-0.95) for Cho, respectively Cho ($P < 0.001$). In addition, the AUC to distinguish HCC from CLH was 1.00 (95% CI; 0.94-1.00) for Lac+TG and 0.87 (95% CI; 0.76-0.94) for Cho ($P < 0.001$).

CONCLUSION

In vivo 1H-MRS was useful to quantify hepatic Lac+TG and Cho levels in both cirrhotic liver and HCC, where higher Lac+TG and Cho

values may be more likely related to development of HCC in the cirrhotic liver.

CLINICAL RELEVANCE/APPLICATION

In vivo 1H-MRS might be potentially useful for noninvasive diagnosis and monitoring of patients with LC regarding the development of HCC by hepatic metabolite quantification.

GI354-SD-WEA4 Performance of Gadoxetic-Acid MRI and Diffusion-Weighted Imaging for the Diagnosis of Early Recurrence of Hepatocellular Carcinoma

Station #4

Participants
Jordi Rimola, MD, Barcelona, Spain (*Presenter*) Consultant, Robarts Clinical Trials, Inc; Research Consultant, Takeda Pharmaceutical Company Limited;
Maria Reig, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Victor Sapena, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Alba Diaz, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose
Carmen Ayuso, MD,PhD, Madrid, Spain (*Abstract Co-Author*) Nothing to Disclose
Alejandro Forner, Barcelona, Spain (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jrimola@clinic.cat

PURPOSE

To determine the value of hepatobiliary phase of gadoxetic-acid (Gd-EOB-DTPA) liver MRI and diffusion-weighted imaging (DWI) for determining whether arterial-phase-enhancing foci on extracellular-contrast MRI (EC-MRI) represent the recurrence of hepatocellular carcinoma (HCC) in cirrhotic patients previously treated with ablation or surgery.

METHOD AND MATERIALS

We prospectively included 40 cirrhotic patients with complete response to resection and/or ablation of early HCC in whom a new focal lesion enhancing in the arterial phase without washout was detected during follow-up with EC-MRI. All patients underwent DWI and Gd-EOB-DTPA MRI; two readers subjectively analyzed signal intensities of arterial-phase-enhancing foci. The final diagnosis was established by histology or follow-up EC-MRI. We used cross-tabulation to calculate indices of diagnostic accuracy.

RESULTS

We evaluated 34 patients (7 women; 73.5% with hepatitis C virus) with a total of 53 new arterial-phase-enhancing foci (median size, 10 [IQR 9-14] mm). The final diagnosis, reached by histopathology in 15 (35.7%) lesions and EC-MR follow-up in 27 (64.3%), was HCC in 42 (79.2%) and benign conditions in 11 (21.8%). Hepatobiliary-phase hypointensity on Gd-EOB-DTPA MRI plus hyperintensity on DWI yielded 54.8% sensitivity, 90.9% specificity, 95.8% positive predictive value, and 34.5% negative predictive value for diagnosing HCC recurrence.

CONCLUSION

Combined findings on hepatobiliary-phase Gd-EOB-DTPA MRI and DWI have the highest specificity and positive predictive value to optimally detect HCC recurrence prior to confident diagnosis by conventional imaging criteria on MRI in cirrhotic liver.

CLINICAL RELEVANCE/APPLICATION

Combined findings on hepatobiliary-phase gadoxetic-acid-enhanced liver MRI and DWI had the highest specificity and positive predictive value for early hypervascular HCC recurrence.

GI404-SD-WEA5 CT in Differentiating Complicated from Uncomplicated Appendicitis: Any-of-10 CT Features versus Radiologists' Gestalt Assessment

Station #5

Participants
Hae Young Kim, MD,MS, Seongnam, Korea, Republic Of (*Presenter*) Nothing to Disclose
Ji Hoon Park, MD,PhD, Seongnam, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sung Soo Lee, Seongnam-si, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Woojoo Lee, Incheon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yousun Ko, MPH, Seongnam-si , Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Roland E. Andersson, Linkoping, Sweden (*Abstract Co-Author*) Nothing to Disclose
Kyoung Ho Lee, MD, Seongnam, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

qkfmrp860329@hotmail.com

PURPOSE

To propose sensitive CT criteria (any-of-10-feature) for complicated appendicitis that could be utilized in non-operative management of appendicitis, and to compare diagnostic performance using any-of-10-feature criteria vs. gestalt assessment.

METHOD AND MATERIALS

This retrospective study, which was conducted in a tertiary teaching hospital, included 100 patients with suspected appendicitis on CT. Complicated appendicitis, defined as gangrenous or perforated appendicitis, was pathologically or surgically confirmed in 32 patients. Six readers independently determined the presence of previously reported 10 CT features of complicated appendicitis (contrast-enhancement defect of the appendiceal wall, abscess, extraluminal air, intraluminal air, extraluminal appendicolith, intraluminal appendicolith, moderate to severe periappendiceal fat stranding, periappendiceal fluid, ileus, and ascites) and rated the likelihood score for complicated appendicitis using gestalt assessment. Sensitivity and specificity of CT for complicated appendicitis was measured by regarding the presence of any one of the 10 features as positive diagnosis (any-of-10-feature criteria) and by using radiologists' gestalt assessment. Pooled sensitivity and specificity were compared using generalized linear mixed model.

RESULTS

Pooled sensitivity of any-of-10-feature criteria was higher than that of gestalt assessment (92% vs. 64%; difference, 28% [95% CI, 10%-46%]; P < 0.001), although pooled specificity was lower (43% vs. 76%; difference, -33% [-48%--17%]; P < 0.001).

CONCLUSION

Without any diagnostic criteria provided, radiologists' CT assessment for complicated appendicitis was not sensitive. Pooled sensitivity of any-of-10-feature criteria was higher than that of gestalt assessment, at the cost of lower specificity.

CLINICAL RELEVANCE/APPLICATION

Multiple recent randomized controlled trials attempted treating uncomplicated appendicitis with antibiotics. Thus, it has become clinically important that CT differentiates complicated from uncomplicated appendicitis. For prudent selection of patients for the non-operative treatment of appendicitis, our diagnostic criteria can be used to diagnose complicated appendicitis sensitively and thereby minimize treatment failure associated with false negative diagnosis of complication.

GI406-SD-WEA7 Utility of Half-Dose of Iodinated-Intravenous Contrast in Dual-Energy Computed Tomography: Qualitative and Quantitative Evaluation of Image Quality and Diagnostic Acceptability

Station #7

Participants
Vishnupriya Kuchana, MBBS, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
A. R. Klekers, MD, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose
Sanaz Javadi, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ahmed K. Elsayes, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose
Jia Sun, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Bilal Mujtaba, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Rizwan Aslam, MBBCh, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Priya R. Bhosale, MD, Bellaire, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Priya.bhosale@mdanderson.org

PURPOSE

To assess the quality of dual-energy-computed-tomography (DECT) imaging in patients receiving half-dose of recommended iodinated-contrast.

METHOD AND MATERIALS

46 oncologic-patients were imaged on a Discovery CT 750 HD dual energy computed assisted (DECT) scanner. Patients received 60-75 ml (half-dose-weight based) of intravenous low osmolar iohexol 350 mg/ml Omnipaque 350, DECT imaging vs 120 -150 ml (ful-dose-weight based) injection on conventional imaging on the portal venous (PV) phase at an injection rate of 3-4 ml/sec . Monochromatic energy images were processed at 60 and 70 keV and 140 kVp. The images were scored by three radiologists independently for image quality and diagnostic acceptability for celiac axis, SMA, aorta, renal artery, kidney, liver, spleen, pancreas and diagnostic acceptability. The 5-point score assigned was 1-Superior; 2-Mildlly inferior; 3-Mild-to-moderately inferior; 4-Moderately inferior (probably influence on diagnosis);5-Markedly inferior (impairing diagnosis). For statistical analysis scores 1 was combined with score 2; score 3 unchanged; score 4 combined with score 5. Regions of interest were drawn on PV, aorta, liver and fat. Contrast to noise ratio (CNR) and singnal to noise ratio (SNR) were calculated. A multivariate ordinal GEE model was used to assess the image quality score, adjusting for reader. Comparisons among series for CNR and SNR were performed based on a linear mixed model. Tukey-Kramer method was used for multiple testing adjustment.

RESULTS

For the qualitative scores for all categories 120 kVp >70keV=60keV>140kVp, except for noise where 120kVp >70keV>60keV=140kVp images. CNR of the portal vein; 60kev = 70kev>120kVp= 140kVp, p<0.0001, CNR aorta and liver had no statistically significant difference was noted between series p=0.22. SNR liver 70keV>60keV=120kVp>140kVp, p<0.0001.

CONCLUSION

All imaging series were considered diagnostically acceptable. 120kVp images were considered slightly better qualitatively. No statistically significant difference was noted in CNR of liver on different series. SNR was better on 70keV images.

CLINICAL RELEVANCE/APPLICATION

DECT images were diagnostically acceptable with half-dose compared to full-dose contrast and can be used specially in patients who have renal insufficiency or low-eGFR <30 and may help protect renal function.

GI407-SD-WEA8 Impact of Dual-Energy 50 keV Virtual Monoenergetic Images on Radiologist Detection and Diagnostic Confidence of Small Hepatocellular Carcinomas Using Multiphase Liver CT

Station #8

Participants
Benjamin Voss, MD, Milwaukee, WI (*Presenter*) Nothing to Disclose
Ashish R. Khandelwal, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Michael L. Wells, MD, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Akitoshi Inoue, MD,PhD, Higashioumi, Japan (*Abstract Co-Author*) Nothing to Disclose
Sudhakar K. Venkatesh, MD, FRCR, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Yong Lee, Rochester, MN (*Abstract Co-Author*) Nothing to Disclose
Ahmed Halaweish, PhD, Rochester, MN (*Abstract Co-Author*) Employee, Siemens AG
Rickey E. Carter, PhD, Jacksonville, FL (*Abstract Co-Author*) Nothing to Disclose
Matthew Johnson, 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; Consultant, Medtronic plc; Consultant, Takeda

Pharmaceutical Company Limited; Grant, Takeda Pharmaceutical Company Limited; ;

For information about this presentation, contact:

fletcher.joel@mayo.edu

PURPOSE

To determine the effect of dual energy (DE) 50 keV virtual monoenergetic images on radiologist detection and diagnostic confidence for small (<= 2 cm) hepatocellular carcinomas in patients with chronic liver disease compared to routine, contrast-enhanced multiphase hepatic CT.

METHOD AND MATERIALS

Patients with chronic liver disease underwent DE multiphase CT imaging using a standardized DE HCC protocol, with 50 keV images reconstructed for the late arterial and delayed phases. Patients with HCC > 2 cm were excluded. Reference standard was established by an independent GI radiologist, with HCC documented by explant, correlative angio, growth, MRI, other histopathology, with this radiologist also noting LI-RADs 3 and LI-RADs 4 lesions that were confirmed on subsequent or prior imaging. 2 GI radiologists interpreted either anonymized mixed kV (0.6 linear blend) or mixed kV with 50 keV images in a random order in 2 reading sessions separated by 2 weeks, evaluating each patients' images once/session. Radiologists identified potential HCC's, rating confidence in LI-RADS 5 diagnosis, arterial enhancement, washout, and patient level confidence in HCC (0-100 scales).

RESULTS

Nineteen of 46 patients had 25 HCCs, and 5 pts had 17 LI-RADs 3/ 4 lesions. HCC size was 1.4 cm ± 1.2 cm. Sensitivity for HCC was similar between mixed kV and mixed kV with 50 keV images (R1 - 80% v. 92.0%, p=0.3; R2 - 92.0% v. 96%, p=0.6). Sensitivity for detection of LI-RADS3/4 lesions significantly improved for one reader and tended to improve for the other with additional 50 keV images (R1 - 65% v. 76%, p = 0.02, R2 - 71% v 94%, p=0.08). Confidence in LI-RADS 5 diagnosis, arterial enhancement, pseudocapsule, and washout for HCC's significantly improved for one reader (p<0.003). For negative patients without HCC, there was a trend for both readers to have appropriately lower patient level confidence in HCC presence (p=0.17).

CONCLUSION

Dual energy 50 keV images significantly increased confidence in LI-RADs 5 diagnosis and imaging findings of arterial enhancement, pseudocapsule, and washout for 1 of 2 radiologists. They improved detection of LI-RADs 3/4 lesions for one reader and tended to improve detection for the other.

CLINICAL RELEVANCE/APPLICATION

Routine acquisition and examination of dual energy 50 keV images will improve the confidence in diagnosis of small HCC's as well as imaging findings of arterial enhancement and tumor washout for some radiologists.

GI408-SD-WEA9 Multiparametric MRI Screening in Hereditary Pancreatic Cancer: Value of A Magnetization-Prepared Gradient Echo Sequence

Station #9

Participants
Bas Boekestijn, MD, Leiden, Netherlands (*Presenter*) Nothing to Disclose
Martin N. Wasser, MD, Leiden, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Shirin Feshtali, Leiden, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Andrew Webb, DPHIL, Leiden, Netherlands (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

In CDKN2A/p16-mutation carriers with a 15-20% lifetime risk of developing pancreatic ductal adenocarcinoma (PDAC), annual MRI surveillance has been shown to successfully detect PDAC at an early stage, resulting in increased resectability and survival. In a retrospective study, we assessed the value of different MRI-techniques in early detection of PDAC.

METHOD AND MATERIALS

Since the start of our surveillance program in 2000, 217 subjects have been enrolled. During the observation period from January 2012 until March 2019, MRI protocols consisted of axial and coronal T2-weighted turbo spin echo (TSE), fat suppressed T1-weighted GRE dynamic contrast-enhanced (DCE), magnetic resonance cholangiopancreaticography (MRCP) and T1-weighted turbo field echo (TFE) sequences. Diffusion weighted imaging (DWI) was added in 2015. Two readers independently analysed the current and former MRI examinations for the presence of lesions and other imaging findings of subjects with a proven PDAC detected during the observation period.

RESULTS

Between January 2012 and March 2019, 16 PDAC were detected, of which 14 (87,5%) were resectable. The average size at pathology was 19 mm (range 6 mm - 70 mm). Fourteen of the 16 cancers were seen by both readers on T1-TFE and T1-DCE. DWI was available in 11 subjects, 7 lesions showed restricted diffusion as seen by both readers. In 11 of 13 subjects with an incident tumor, a lesion or indirect signs of malignancy could retrospectively be seen on previous examinations. In 2 subjects a lesion was retrospectively only visible on T1-TFE. The average growth rate of 9 retrospectively measurable lesions was 6.7 mm per year (s = 3.0) with an estimated volume doubling time of 157.5 days (s = 62.7).

CONCLUSION

Annual MRI surveillance in asymptomatic individuals at high risk of developing PDAC results in detection of tumours in a potentially resectable stage. A T1-weighted TFE sequence seems especially promising for detecting early pancreatic cancer.

CLINICAL RELEVANCE/APPLICATION

Annual MRI surveillance is able to detect early pancreatic cancer in high risk individuals, a T1-TFE sequence further enhances multiparametric protocols.

Participants

GI410-SD-WEA10 Assessment of Liver Surface Nodularity, Sarcopenia, and Visceral Obesity as Predictors of Cardiometabolic Risk Factors in African Americans

Station #10

Elliot Varney, MD, Jackson, MS (*Presenter*) Nothing to Disclose
Edward Florez, PhD, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose
Sarah Miller, BS, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose
Candise R. Johnson, Clinton, MS (*Abstract Co-Author*) Nothing to Disclose
Benjamin Rushing, BS, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose
Charlene Claudio, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose
Seth Lirette, MS, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose
Candace M. Howard-Claudio, MD, PhD, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess the association of Liver Surface Nodularity (LSN) with quality muscle mass (sarcopenia) and visceral fat depots in a high-risk population of African Americans (AAs).

METHOD AND MATERIALS

For this HIPPA-compliant, IRB approved retrospective observation study, non-enhanced abdominal CT images were obtained in 2475 African American participants. Anthropometric indices such as waist circumference (WC) and sagittal abdominal diameter (SAD) were measured in each subject using a DICOM software (OsiriX MD). In addition, regional abdominal muscles and fat volumes, including visceral adipose tissue (VAT) and superficial adipose tissue (SAT), were measured using a multi-layer segmentation software (slice-O-matic, TomoVision). Next, a validated quantitative software was used to measure LSN scores in 10 different slices on the left lobe of the liver. Finally, a statistical assessment was performed to correlate LSN scores with WC, SAD, VAT and SAT volumes, and intraclass correlation coefficients (ICC) with 95% confidence intervals were used to assess inter-observer variability in all parameters.

RESULTS

LSN scores showed direct correlation with WC (R2=0.19, 0.44, p<0.001), SAD (R2=0.20, 0.45, p<0.001), and all individual fat compartments. On the other hand, our results support what has been suggested by several recent studies that WC > 100 cm and SAD > 25 cm are more likely to be associated with metabolic disturbances. For SAD >= 25 cm, each 1 cm increase in SAD was associated with a 0.07 unit increase in LSN (ß=0.07, p<0.001). Analogously, for WC >= 100 cm there was a WC increase associated with the LSN score (ß=0.02, p<0.001). Likewise, inter-observer variability between two readers in a sub-cohort (n=300) shows excellent interclass correlation coefficient values (ICC>0.93, 95% CI) for all parameters.

CONCLUSION

This study shows a direct association between LSN score, anthropometric indices, abdominal fat depots and muscle volumes. Anthropomorphic measurements above a certain cut-off point (i.e. SAD >= 25cm and WC > 100cm for this study), were linked with increased LSN scores.

CLINICAL RELEVANCE/APPLICATION

Non-alcoholic fatty liver disease (NAFLD) is the most common liver disease in the Western world, is clinically silent, and is closely related to obesity and cardiometabolic disease. Anthropometrics as readily obtainable, low-cost biomarkers to predict NAFLD could increase its surveillance and diagnosis, earlier than conventional techniques.

GI410-SD-WEA11 Diagnostic Value of CT Lymphangiography (CTL) in Primary Intestinal Lymphangiectasia (PIL)

Station #11

Participants

Qingqing Zhao, BMedSc, Beijing, China (*Presenter*) Nothing to Disclose
Xiaoli Sun, MD, PhD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Rengui Wang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

1059097893@qq.com

PURPOSE

To investigate the clinical value of CT lymphangiography (CTL) in the diagnosis of primary intestinal lymphangiectasia (PIL).

METHOD AND MATERIALS

22 patients diagnosed as PIL with capsule endoscopy from 2010 to 2018 were retrospectively analyzed. All patients underwent CTL, and the imaging data were compared with endoscopic and pathological findings. CTL assessments included thickening of the intestinal wall, intestinal and mesenteric lymphangiectasia, serous effusion and its range, abnormal lymphatic vessels in the neck, thorax, abdomen, and pelvis. Based on the distribution of contrast media in intestines and mesentery,PIL was divided into four groups for comparison and statistical analysis. The statistically significant difference was set at P <0.05.

RESULTS

CTL displayed the intestinal and extra-intestinal lesions: intestinal wall thickening(n=19,unsatisfactory observation due to intestinal contraction in 1 case; 3-6 mm in 4 cases, 6-9 mm in 10 cases,>= 9 mm in 5 cases); intestinal and mesenteric lymphangiectasia (n=18, 3 cases in the mesentery, 9 cases in the intestinal wall and mesentery, 6 cases in the intestinal lumen); serous effusion (n=14), including ascites (n=8), pleural effusion (n=1), and ascites accompanied by pleural effusion (n=5); retroperitoneal and near iliac blood vessels changes(n=21): lumbar lymph trunk reflux (n = 12), right axilla(n=5), left axilla(n=4); abdominal and pelvic lymphangiectasis (n=17): 4 cases in pelvic fat gap, 10 cases, 15 cases, 6 cases, 13 cases in hilar, pancreas, spleen and omentum respectively, 5 cases in kidney, including 1 case in left, 2 cases in right, and 2 cases in both side; Mediastinal lymph reflux (n=10); abnormal distributions of contrast media around thoracic outlet (n =20),including 8 in bilateral neck, 12 in left venous angle. PIL was divided into four groups according to whether the contrast agent was distributed in the intestinal wall, intestinal lumen and mesentery. There was no significant difference in the abnormal distribution of CTL and the degree of intestinal wall thickening.

CONCLUSION

Compared to endoscope, CTL can not only show the intestinal tube and extraintestinal lesions, but also show the distribution and extent of abnormal lymphatic vessels, which is valueable for the diagnosis and treatment of PIL.

CLINICAL RELEVANCE/APPLICATION

CT lymphangiography (CTL) is useful in detecting PIL.

GI309-ED-WEA12 Intestinal Ostomies: What Radiologists Need to Know

Station #12

Participants
Sara Khanipour Roshan, MD , Darby, PA (*Presenter*) Nothing to Disclose
Christian Pedersen, MD, Darby, PA (*Abstract Co-Author*) Nothing to Disclose
Aparna Srinivasa Babu, MD, Villanova, PA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

sarradon7@gmail.comsara.roshan@mercyhealth.org

TEACHING POINTS

Review of different types of ostomies, their definitions and indications. Pictorial review of normal postoperative changes. Pictorial review of postoperative complications. Differentiate expected postoperative findings from postsurgical complications.

TABLE OF CONTENTS/OUTLINE

1. Types of ostomies, their definitions and indications Ileostomies Loop ileostomy End ileostomy End ileostomy with rectal stump Colostomies Loop colostomy End colostomy End colostomy with rectal stump (Hartman Procedure) End colostomy with mucus fistula (Double-barrel colostomy) 2. Normal anatomy of ostomies 3. Early and late postoperative complications Obstruction Parastomal hernia Peristomal fistula Peristomal varices Ileostomy Enteroliths Stomal recurrence of Crohn's disease

GI310-ED-WEA13 Cinematic Rendering in Abdominopelvic Pathologies: How This Novel Tool Can Help

Station #13

Participants
Davi D. Romao, MD, Sao Paulo , Brazil (*Presenter*) Nothing to Disclose
Bernardo S. Oliveira, MD, Rio de Janeiro , Brazil (*Abstract Co-Author*) Nothing to Disclose
Felipe V. Rodrigues, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Alexandre M. Pereira, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Natally Horvat, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Publio C. Viana, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Cinematic rendering (CR) is a new 3D rendering technique that generates images based on a new lighting model, much more complex than traditional Volume Rendering (VR), being able to produce photorealistic images that have potential to illustrate more details of a complex anatomy This exhibit aims to: - Describe the Cinematic Rendering technique for 3D visualization of Computed Tomography (CT) image data compared to traditional VR method; - Illustrate challenging cases of abdominopelvic pathologies using CR images; - Describe the potential role of CR in abdominopelvic imaging; - Describe current limitations and future opportunities for CR.

TABLE OF CONTENTS/OUTLINE

1. Introduction a. Physics b. Literature Review c. Applications 2. Cases a. Pancreatic Lesions b. Abdominal Wall Hernias c. Vascular d. Bones e. Miscellaneous 3. Conclusion

GI307-ED-WEA14 Spectrum of Rectus Abdominis Masses: What, When, and Why

Station #14

Participants
Jian Guan, MD, Guangzhou, China (*Presenter*) Nothing to Disclose
Yang Peng, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Jing Zhao Jr, MD, PhD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Fan Zhang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Huanjun Wang, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Xuhui Zhou, MD, PhD, Shenzhen, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

usefulkey0077@hotmail.com

TEACHING POINTS

To classify masses of rectus abdominis according to their pathologic and clinical aspects (inflammation/tumor-like lesion/benign and malignant tumor, focal lesion/part of a systemic disease, with/without history of rectus abdominis incision surgery). To review the typical CT and MRI findings of rectus abdominis masses and learn the imaging mimics. To emphasize the key points in addition to imaging for differentiation, including the history of a systemic disease, surgery (if yes, when), sex (female) and other specific symptoms related (4S). To realize the underlying etiology of the masses and avoid missed and mis-diagnoses of related lesions out of rectus abdominis. To discuss the diagnostic strategy based on both clinical aspects and imaging features.

TABLE OF CONTENTS/OUTLINE

Anatomical features of rectus abdominis and clinical relevance. Classification of masses of rectus abdominis according to their pathologic and clinical aspects. Imaging findings of sample cases and the corresponding key clinical features for differentiation. a) Sample cases with different pathologic natures (inflammation/tumor-like lesion/benign and malignant tumor). b) More complicated

cases with history of surgery at different time points and systemic diseases. Summary of key points in differentiation and diagnostic strategy.

GI308-ED-WEA15 Pancreatic Transplantation: A Multimodality Pictorial Review

Station #15

Awards

Certificate of Merit

Participants
Maira Hameed, MA,BMBCh, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Shema Hameed, MBBS,FRCR, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Steven S. Moser, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Anand Muthusamy, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Christopher J. Harvey, MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

m.hameed@imperial.ac.uk

TEACHING POINTS

Become familiar with the common anatomical appearances of pancreatic grafts and their normal post-operative appearances across a range of imaging modalities (ultrasound, CT, MRI, conventional angiography) Be able to recognise the spectrum of early and late post-operative complications related to pancreatic transplant; i) vascular, ii) enteric and iii) parenchymal 'What the transplant surgeon wants to know'

TABLE OF CONTENTS/OUTLINE

Background to whole organ pancreatic transplant and the role of radiologists Illustrations of pancreatic transplant anatomy (arterial supply, venous and exocrine drainage), including common surgical variations Normal graft post-operative appearances across a range of imaging modalities Vascular complications i) venous thrombosis, ii) arterial (Y graft stenosis/occlusion), iii) pseudoaneurysm, iv) arteriovenous fistula Parenchymal complications i) peripancreatic collections (duct disruption, haematoma, pseudocyst, seroma and abscesses), ii) pancreatitis Enteric complications i) enteric leak and bleeding, ii) fistula, iii) bowel obstruction 'What the transplant surgeon wants to know' Top tips for graft ultrasound Imaging findings are a combination of US (including contrast-enhanced), CT, MRI, conventional angiography (including post-intervention)

GI312-ED-WEA16 Extranodal Extension Grading Atlas to Decide the Multimodal Treatment Strategy for Esophageal Squamous Cell Carcinoma

Station #16

Awards

Cum Laude

Participants
Naoya Okada, MD, Sapporo, Japan (*Presenter*) Nothing to Disclose
Mototaka Miyake, MD, Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

o_naoya_o@me.com

TEACHING POINTS

The importance of the extranodal extension (ENE) of metastatic lymph nodes on the prognosis of esophageal squamous cell carcinoma (ESCC) is emerging, same as the head and neck squamous cell carcinoma. The accurate clinical diagnosis of ENE is important to plan the adequate multimodality treatment, to predict not only prognosis but also difficulty of operative procedure during the lymph node dissection. In this education exhibit, 1.To show the correlation between three-dimensional computed tomography (3D-CT) imaging findings and pathological findings with the information of surgical findings. 2.To familiarize the audience with the representative ENE case series and to understand key imaging findings suggesting the presence of ENE; that is, "largest diameter >10 mm", "Infiltration of adjacent planes", "irregular border", "heterogeneity", and "radiologist's impressions".

TABLE OF CONTENTS/OUTLINE

1. The histologic definition of ENE.2. Review of the imaging findings of metastatic lymph nodes to suggest the presence of ENE.3. ENE grading atlas using the imaging correlation with surgical and pathological findings. 4. To show the case series with the cervical, the mediastinal, and the upper abdominal metastatic lymph nodes, showing the correlation among 3D-CT imaging, pathological findings, and endoscopic surgical view.

GIS-WEB

Gastrointestinal Wednesday Poster Discussions

Wednesday, Dec. 4 12:45PM - 1:15PM Room: GI Community, Learning Center

GI

AMA PRA Category 1 Credit ™: .50

FDA Discussions may include off-label uses.

Participants
Dmitriy G. Akselrod, MD, Charlotte, VT (*Moderator*) Nothing to Disclose

Sub-Events

GI355-SD-WEB1 Clinical Benefit of Portography on the Spectral CT with Fast kVp-Switching Single-Source Dual-Energy CT Scanning: Comparison with Conventional Helical Scan on the Different Volume of Contrast Medium Injection Protocol

Station #1

Participants
Tomokatsu Tsukamoto, MS,RT, Onomichi, Japan (*Presenter*) Nothing to Disclose
Takashi Takahata, RT, Onomichi, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshinori Kawamoto, RT, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Keisuke Nishihara, MD, Onomichi, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazunari Mesaki, MD, Onomichi, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroki Mori, MD, Onomichi, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomoshige Sato, RT, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

In conventional 120 kVp helical scan, maintaining image quality of CT Portography is more difficult than arterial CT angiography (CTA). However, with the use of fast kVpswitching single-source dual-energy (ssDE) CT spectral mode the monochromatic (MONO) images can provide suitable keV imags while maintaining image quality of portography. The purpose of this study is to assess clinical benefit of portography on the spectral ssDECT.

METHOD AND MATERIALS

In this study, 5 groups (total 161 patients) were designed with different scan modes and volume of contrast medium injection protocols: A(650mgI/kg, 31 patients), B(600 mgI/kg, 30 patients) and C(520 mgI/kg, 30 patients) for POLY scan mode (0.984pitch ; 120kVp, 0.5 sec; Noise Index(5mm):10, 30% ASiR); D(600 mgI/kg, 35 patients) and E(520 mgI/kg, 35 patients) for MONO (66keV, optimal. keV) scan mode (ssDECT scanner, Discovery CT750 HD, GE Healthcare, USA). CT attenuation value(HU) of portal vein and the standard deviation (SD) were measured to calculate contrast-to-noise ratio (CNR). Image quality of the three-dimensional portography was assessed by 3 radiologists independently). Using a 5-point score (1: poor; 3: diagnosable, 5 excellent).

RESULTS

The CT attenuation value (HU) of different modes (A, B, C, D(66keV, Opt.keV), E(66, Opt.keV.)) for the portal vein (PV), average CNRs and scoring results were reported as follows: (223.0± 25.0 HU, 203.4 ± 23.6, 187.1 ± 14.1, 246.4 ± 27.4, 449.6 ± 61.4, 231.8 ± 26.8 and 401.2 ± 51.4), (4.4± 1.3, 4.1 ± 1.4, 3.6 ± 1.0, 6.1 ± 1.7, 6.6 ± 1.8, 5.8 ± 1.3 and 6.1 ± 1.5), and (3.4± 1.0, 3.1 ± 1.1, 2.3 ± 0.7, 4.2 ± 0.8, 4.3 ± 0.8, 4.0 ± 0.7 and 4.1 ± 0.8), respectively.The low contrast injection protocol with MONO image (E-520mgI/kg) had image quality than high contrast injection protocol (A-650mgI/kg) with conventional 120 kVp helical scan.

CONCLUSION

From this study, ssDE GSI scan mode can essentially reduce injection volume of contrast material with same or higher image quality comparing to conventional 120kVp helical scan mode.

CLINICAL RELEVANCE/APPLICATION

This study is useful for reducing volume of contrast material by using GSI (gemstone spectral imaging) scan mode.

GI357-SD-WEB3 Liver Imaging Reporting and Data System: Comparison in Diagnostic Performance between Computed Tomography and Gadoxetic Acid-Enhanced Magnetic Resonance Imaging

Station #3

Participants
Sei Nakao, Ube, Japan (*Presenter*) Nothing to Disclose
Masahiro Tanabe, MD, Ube, Japan (*Abstract Co-Author*) Nothing to Disclose
Munemasa Okada, MD, PhD, Ube, Japan (*Abstract Co-Author*) Nothing to Disclose
Matakazu Furukawa, MD, Ube, Japan (*Abstract Co-Author*) Nothing to Disclose
Etsushi Iida, MD, Ube, Japan (*Abstract Co-Author*) Nothing to Disclose
Keisuke Miyoshi, Ube, Japan (*Abstract Co-Author*) Nothing to Disclose
Naofumi Matsunaga, MD,PhD, Nagasaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Katsuyoshi Ito, MD, Ube, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine the consistency of major features of hepatocellular carcinoma (HCC) in Liver Imaging Reporting and Data System (LI-RADS) v2018 between CT and gadoxetic acid-enhanced MRI and to investigate the additional value of hepatobiliary phase (HBP) MR images.

METHOD AND MATERIALS

Patients who underwent dynamic CT and gadoxetic acid-enhanced MRI within one month were included. Two radiologists respectively evaluated the presence or absence of major HCC features (arterial phase hyper-enhancement, washout appearance and capsule appearance) and categorized observations using the LI-RADS v2018 algorithm. Additionally, each observation was recorded as hyper-, iso- or hypo-intensity on the HBP image.

RESULTS

Sixty-one patients with 110 observations were included. Among the 88 observations classified as LR-3, 4 or 5, arterial phase hyper-enhancement and a washout appearance showed higher frequencies on CT than on MRI (75.0% [66/88] vs. 58.0% [51/88], P<0.001; 60.2% [53/88] vs. 44.3% [39/88], P=0.014), whereas the frequency of capsule appearance was not significantly different between CT and MRI (14.8% [13/88] vs. 10.2% [9/88], P=0.343). Of the 47 LR-3 observations categorized on CT (HCC=22, non-HCC=25), 71.4% (20/28) of observations with hypo-intensity on HBP images were HCCs, whereas 89.5% (17/19) of observations with iso- or hyper-intensity on HBP images were non-HCCs (P<0.001). Similarly, of the 59 LR-3 observations categorized on MRI (HCC=30, non-HCC=29), 70.0% (28/40) of observations with hypo-intensity on HBP images were HCCs, whereas 89.5% (17/19) of observations with iso- or hyper-intensity on HBP images were non-HCCs (P<0.001).

CONCLUSION

The frequencies of arterial phase hyper-enhancement and washout appearances were higher on CT than on gadoxetic acid-enhanced MRI. For the LR-3 observations, adding the hepatobiliary phase hypo-intensity to major HCC features improved the diagnostic performance of LI-RADS for distinguishing HCCs from benign liver lesions.

CLINICAL RELEVANCE/APPLICATION

Gadoxetic acid-enhanced MRI has an important role in the surveillance for HCC because adding the HBP hypo-intensity to major HCC features can improve the diagnostic performance of LI-RADS for HCCs.

GI411-SD-WEB4 Severity Assessment of Acute Pancreatitis by Iodine Mapping with Dual-Energy Computed Tomography

Station #4

Participants
Hirotaka Hamada, Shinagawa-ku, Japan (*Presenter*) Nothing to Disclose
Tomoki Fujii, MS,RT, Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose
Hisaya Sato, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose
Kyoichi Kato, Yokohama, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

h.h-0317@cmed.showa-u.ac.jp

PURPOSE

To investigate usefulness of visual and quantitative evaluation by iodine mapping with dual energy computed tomography (DECT) for severity assessment of acute pancreatitis (AP).

METHOD AND MATERIALS

20 patients with severe acute pancreatitis (SAP) and 20 patients with mild acute pancreatitis (MAP) were analyzed retrospectively. All patients underwent contrast enhanced CT scan by DECT. Visual evaluation: iodine mapping and pancreatic perfusion CT (PPCT) imaging were compared in same SAP patient. Quantitative evaluation: pancreatic iodine concentration was measured venous phase and compare between SAP and MAP. Clinical application: Iodine concentration analysis of SAP patients misdiagnosed as MAP from conventional CT images of onset date.

RESULTS

Iodine mapping can provide hemodynamics related to pancreatic necrosis, a characteristic of severe acute pancreatitis as same as Pancreas Perfusion CT imaging. Iodine-concentration in the patients with severe acute pancreatitis were lower than mild acute pancreatitis significantly (p<0.001 as t-test). when the cut-off value of iodine concentration is 39.4%, the sensitivity is 95.2%, the specificity is 70.2%, and the area under the curve by ROC analysis is 0.84. The iodine concentration of SAP misdiagnosed as MAP is lower than cut-off value.

CONCLUSION

Iodine mapping with DECT can provide hemodynamics images like a PPCT imaging and assess severity of AP quantitatively.

CLINICAL RELEVANCE/APPLICATION

Iodine mapping with DECT shows high diagnostic value in the severity assessment of acute pancreatitis (AP) and will help decide treatment policy.

GI412-SD-WEB5 Differentiating New Hepatic Metastases from Focal Hepatopathy in Patients During Treatment for Malignancy

Station #5

Participants
Steffen Haider, MD, New York, NY (*Presenter*) Nothing to Disclose
Lyndon Luk, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Benjamin Navot, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

Firas S. Ahmed, MBChB, MPH, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Jonathan Susman, MD, Englewood, NJ (*Abstract Co-Author*) Research Consultant, BioSphere Medical, Inc
Elizabeth M. Hecht, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

sth9053@nyp.org

PURPOSE

To differentiate between liver metastases versus benign focal hepatopathy (FH) that develops over the course of medical or surgical treatment of malignancy.

METHOD AND MATERIALS

Between 2010 and 2018, there were 1179 consecutive biopsies (1069 patients) of hepatic lesions suspicious for malignancy. 924 were True Pos, 169 True Neg (TN), 43 False Neg and 43 lost to follow up. Among the TN were 22 FHs defined as new lesions following oncologic treatment and histologically as steatosis, sinusoidal and biliary congestion/obstruction or inflammation. Cirrhotic patients, primary hepatic tumors and abscesses were excluded. Patients with FH and metastases were matched for age, malignancy-type and treatment regimen. 3 abdominal radiologists (1, 1, 3 y post-fellowship) blinded to pathology reviewed pre-biopsy MR (40 malignant: 13 FH) and CT (53: 12); 3 FH pts had both MRI and CT. A 5-point Likert scale (1: definitely benign, 5: definitely malignant) and imaging characteristics were assessed. A training data set for readers was provided to introduce a common lexicon. Univariate analyses (Chi-Sq, T-test), logistic regression and inter-rater reliability (kappa, spearman, ICC) were performed.

RESULTS

Characteristics of patients with FHs included: pancreatobiliary malignancies (68%), hepatobiliary/GI surgery or stent (77%) and chemotherapy within 1y prior to biopsy (50%). Results for MR: Likert 2.3-2.5 for FH vs 3.6-4.4 for metastases (p<.05, correlation=.49). Compared to FH, metastases were associated with multiplicity (>3 lesion/liver), larger size, arterial rim-enhancement, portal venous rim-enhancement/central hypoenhancement and restricted diffusion (P< 0.05, all readers, univariate, k=.48-.81 except arterial rim k=0.22, ICC=.91). Lesion multiplicity was associated with metastasis on multivariate analysis. For CT: Likert 2.3-4.0 for FH vs 3.8-4.9 for metastases (p<.05, correlation .47-.58). Only non-spherical shape was associated with FH (p<.05, all readers, k=.33-.89 except arterial rim .08-.22, ICC .97-.99).

CONCLUSION

Multiplicity, size, enhancement and diffusion characteristics may be helpful to distinguish FH from metastases on MR whereas only non-spherical shape was helpful on CT.

CLINICAL RELEVANCE/APPLICATION

Identification of FH could increase confidence in radiologic-pathologic correlation and limit biopsies following the medical-surgical treatment of malignancy. MRI may be more helpful than CT in distinguishing FH from metastases.

GI413-SD-WEB6 CT Radiomics to Predict Chemotherapy Tumor Response in Metastatic Colorectal Cancer

Station #6

Participants
Kerry L. Thomas, MD, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose
Dalanda M. Diallo, MD, Brandon, FL (*Abstract Co-Author*) Nothing to Disclose
Melissa J. McGettigan, MD, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose
Jin Qi, MD, Tian Jin, China (*Abstract Co-Author*) Nothing to Disclose
Natarajan Raghunand, PhD, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose
Mahmoud Abdalah, PhD, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose
Junmin Zhou, Tampa , FL (*Abstract Co-Author*) Nothing to Disclose
Jongphil Kim, PhD, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose
Daniel K. Jeong, MD, Tampa, FL (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Kerry.Thomas@moffitt.org

PURPOSE

To evaluate whole lesion pre-therapy CT radiomic features of liver metastases for predicting response to chemotherapy in patients with metastatic colorectal cancer.

METHOD AND MATERIALS

Retrospective cohort of 75 subjects (44 males, age 58 ± 12) with treatment-naïve, colorectal adenocarcinoma liver metastases and measurable disease by RECIST v1. Revelant radiomic (n= 111) features were extracted with Healthmyne QIDS (Healthmyne, Madison, WI) and a custom MATLAB (The Mathworks Inc., Natick, Massachusetts) routine from selected target lesions on venous phase contrast-enhanced pre-chemotherapy CTs. Simple logistic regression and receiver operating characteristic (ROC) analysis were performed and values were compared between RECIST responders and non-responder groups at 1st and 2nd follow up imaging after initiation of chemotherapy post standard of care chemotherapy initiation. Multivariate analysis included 12 radiomic features (p<0.1 from simple logistic regression) which were used to build a model to evaluate response after chemotherapy.

RESULTS

While no significant pre-chemotherapy CT liver lesion features corresponded with RECIST response at initial follow up, 4 radiomic features were predictive by the 2nd follow up CT(p<0.05). These textural or morphologic features include: Gray level size zone matrix (GLSZM), Zone size non uniformity normalised OR(95% CI): 2.32 (0.16-0.79) p=0.017, Surface¬ to volume ratio 0.38 (0.17-0.85) p=0.019, Neighborhood Gray Tone Difference Matrix (NGTDM) Strength 0.02 (<0.001-0.75) p=0.035, and 3D Wavelet P2 L2 C12 0.26(0.07-0.99) p=0.049. Multivariate logistic regression analysis to predict response by 6 months using principal component analysis yielded an AUROC (95% CI) 0.75 (0.61-0.89), p=0.04.

CONCLUSION

CT radiomic analysis may potentially serve as an adjunct to predict liver metastasis response to chemotherapy in patients with metastatic colorectal cancer over time. Future prospective studies with larger cohorts may prove worthwhile to determine the role of radiomics in clinical decision making for patients where chemotherapy may not be well tolerated.

CLINICAL RELEVANCE/APPLICATION

Radiomic analysis of tumor features on CT could potentially serve as an adjunct to predict tumor response to chemotherapy in patients with metastatic colorectal cancer over time. This could help clinical decision making in patients where chemotherapy may not be well tolerated.

GI414-SD-WEB7 Readers' Preferences and Objective Analysis of DECT in Acute Appendicitis

Station #7

Participants
Naama Lev-Cohain, MD, Jerusalem, Israel (*Presenter*) Nothing to Disclose
Nahum Goldberg, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose
Nadia Caplan, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose
Isaac Leichter, PhD, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose
Jacob Sosna, MD, Jerusalem, Israel (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

naamal@hadassah.org.il

PURPOSE

To evaluate quantitively and qualitatively whether low monoenergetic images at 50 keV demonstrate improved quality compared to conventional images for imaging of acute appendicitis and to assess reader's preferences.

METHOD AND MATERIALS

A retrospective study of 42 clinically indicated CT exams conducted on a single source DECT (IQON, Philips, Eindohoven) was performed. The patient population male: female ratio was 1.4:1, average age was 44 (18-82), all were pathologically proven inflamed appendix. A single representative image was chosen from each study and an ROI was drawn along the appendix wall for HU, CNR and SNR values measurements. Comparison of these parameters on the conventional and low monoenergetic images was performed. In addition, all 84 images were randomized, anonymized and presented to two abdominal radiologists; for a 5-point scale quality grading evaluating of the bowel wall thickening, enhancement, conspicuity and mucosal visualization. Lastly, bowel wall enhancement visibility assessment was conducted on conventional and monoenergetic images side-by-side by 3 abdominal radiologists. Paired samples t-tests, a-parametric Wilcoxon test, McNemar test and kappa statistics were used for statistical analysis.

RESULTS

Attenuations of the bowel wall were significantly higher in the monoenergetic images compared to the conventional images, showing increase by a ratio of 1.7 ($P<0.05$). Significant increase was seen in the SNR (8.88, SD-3.27 vs 5.37, SD-1.84) and CNR (20.96, SD-4.91 vs 14.9, SD-3.04) on the low monoenergetic images as well ($p<0.05$) compared to the conventional images, by a ratio of 1.4 and 1.6 respectively. In the quality grading mucosal visualization, enhancement and conspicuity showed significantly higher scores by both readers ($P<0.05$), while bowel wall thickening showed a trend ($p=0.229$). There was clear preference of the monoenergetic images among all the visibility assessments by all readers.

CONCLUSION

There is significant and consistent increase in CNR and SNR in the 50KeV monoenergetic images compared to the conventional ones. The monoenergetic images showed significant better visualization of most characteristic active inflammation properties in appendicitis and abdominal radiologists clearly preferred them.

CLINICAL RELEVANCE/APPLICATION

The use of low monoenergetic images should be considered in clinical practice to assist accurate diagnosis of active bowel inflammation.

GI415-SD-WEB8 Evaluation of Small Equivocal Cystic Lesions of the Pancreas Using Contrast-Enhanced Spectral-Detector CT: Single Institution Study in 25 Lesions

Station #8

Participants
Kai Roman Laukamp, MD, Cleveland, OH (*Presenter*) Nothing to Disclose
Sreeharsha Tirumani, MBBS, MD, Beachwood, OH (*Abstract Co-Author*) Nothing to Disclose
Simon Lennartz, MD , Cologne, Germany (*Abstract Co-Author*) Institutional Research Grant, Koninklijke Philips NV
Amit Gupta, MBBS, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Markus M. Obmann, MD, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Nils Grosse Hokamp, MD, Koln, Germany (*Abstract Co-Author*) Speakers Bureau, Koninklijke Philips NV
Navid Faraji, MD, Hudson, OH (*Abstract Co-Author*) Nothing to Disclose
Robert C. Gilkeson, MD, Cleveland, OH (*Abstract Co-Author*) Research Consultant, Riverain Technologies, LLC Research support, Koninklijke Philips NV Research support, Siemens AG Research support, General Electric Company
Thorsten Persigehl, MD, Koeln, Germany (*Abstract Co-Author*) Nothing to Disclose
Nikhil H. Ramaiya, MD, Shaker Heights, OH (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Kai.Laukamp@UHhospitals.org

PURPOSE

Dual-energy CT has shown its potential to improve evaluation of smaller cystic renal lesions. In this study, we evaluated if this

approach can be transferred to the pancreas to improve diagnostic assessment of equivocal small cystic lesions using a novel dual-energy spectral-detector CT (SDCT).

METHOD AND MATERIALS

For this retrospective study, we reviewed the reports of 1192 contrast-enhanced late venous-phase SDCT-scans of the abdomen that were conducted between May 2017 and January 2019. 25 small (<=1.5 cm) cystic pancreatic lesions of 22 patients (mean age: 74.9±7.8 years and comprising 12 women and 11 men) were identified that received additional short-term CT follow-up or dedicated MRI because lesions were evaluated as equivocal in the report. Conventional images (CI) and spectral images (SI) including virtual monoenergetic images at 40 keV (VMI), iodine density and iodine overlay were reconstructed. Two readers indicated lesion conspicuity and diagnostic certainty for presence of cystic nature and fluid content of the lesion on 3-point scales. The reading was conducted in a two-step approach: first, solely CI were evaluated, while in a second reading after a 4-week interval, the combination of CI and corresponding SI was reviewed. Quantitatively, mean attenuation was measured ROI-based in CI and VMI at 40 keV. Signal-to-noise (SNR) and contrast-to-noise ratios (CNR) of the lesion were calculated. Interobserver agreement was assessed using intraclass-correlation-coefficient (ICC). Wilcoxon signed-rank test was used to test for any difference.

RESULTS

In the subjective reading, SI significantly improved lesion conspicuity (CI: 2[1-2], SI, 3[2-3], p<0.001) and diagnostic certainty regarding presence of cystic nature (CI: 2[1-2], SI: 3[3-3], p<0.001). Interobserver agreement improved considerably from 0.51 to 0.85 when the combination with SI was used. Further, VMI displayed significantly higher SNR and CNR ratios for the cystic lesions (SNR, CI: 1.4±1.5 versus VMI: 3.5±2.4, p<0.001; CNR, CI: 2.5±0.7 versus VMI: 4.5±1.9, p<0.001).

CONCLUSION

Compared with CI, the combination with SI from SDCT significantly improved visualization and diagnostic certainty for evaluation of small incidental cystic pancreatic lesions.

CLINICAL RELEVANCE/APPLICATION

Implemented in clinical workflow SI could help for improved detection and evaluation of this challenging lesion type, potentially reducing the amount of additional short-term imaging.

GI416-SD-WEB9 Comparative Quantification of Liver Iron Concentration at 1.5T and 3T: Standardization Proposal

Station #9

Participants
Thibaut Lapotre, MD, Rennes, France (*Presenter*) Nothing to Disclose
Anita Paisant, Angers, France (*Abstract Co-Author*) Nothing to Disclose
Elise Bannier, Rennes, France (*Abstract Co-Author*) Nothing to Disclose
Edouard Bardou-Jacquet, Rennes, France (*Abstract Co-Author*) Nothing to Disclose
Yves Gandon, MD, Rennes, France (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yves.gandon@univ-rennes1.fr

PURPOSE

To analyze the difference in quantification of liver iron concentration (LIC) obtained by different methods, at 1.5T and 3T.

METHOD AND MATERIALS

40 patients, included prospectively after providing written consent, underwent two MR studies (GEMS 1.5T MR450 and Siemens 3T Prisma) performed consecutively using a manufacturer's sequence, yielding an R2* map, and a standardized multi-echo GRE (ME-GRE) sequence obtained with the body coil and surface coil. UTE sequences were added to the 3T studies. MRQuantif software, validated at 3T, was used to calculate R2* (truncation and extrapolation method with simple and complex exponential modeling) and SIR-LIC (Alustiza and Gandon methods), and provide ref-LIC. A standardized R2*-LIC (R2*/magnetic field) was also used for analysis, performed by linear regression (r^2) and Bland and Altman's method.

RESULTS

The r^2 correlation between R2*-LIC calculated at 1.5T and 3T was 0.85 with the two maps and 0.99 with the ME-GRE sequence. The bias was respectively 15µmol/g [8µmol/g; 23µmol/g] and 4µmol/g [2µmol/g; 6µmol/g] (p = 0.001). Compared with ref-LIC, R2*-LIC bias was +0.2 µmol/g [-4 µmol/g;4 µmol/g] and -4 µmol/g [-8 µmol/g;1 µmol/g] at 1.5T and 3T, respectively. At 1.5T, the bias between SIR-LIC and ref-LIC was -14.3µmol/g [-24µmol/g; -4.9µmol/g] (p=0.004) and +25µmol/g [+18µmol/g; 32µmol/g] for the Alustiza and Gandon methods, respectively. At 3T, two high overloads were only correctly quantified with R2* calculated from the body coil, allowing calculation of R2* by extrapolation, or with the UTEs. Despite this, the r^2 correlation between the two coils was 0.97.

CONCLUSION

The bias between the 1.5T and 3T results is reduced by using 1) a generic ME-GRE sequence obtained with the body coil, 2) a unique tool for R2* calculation, and 3) the same conversion formula (MR-LIC = R2*/magnetic field).

CLINICAL RELEVANCE/APPLICATION

A robust and accurate quantification of the LIC by MRI is necessary for appropriate therapeutic management and monitoring of efficacy.

GI409-SD-WEB10 CT and MRI of Diffuse Liver Disease: Roadmap to an AI-Based Algorithm for Multiparametric Categorization of Parenchymal Disease Differentiating Steatosis, Steatohepatitis, and Cirrhosis from Normal Parenchyma

Station #10

Participants

Ricardo Donners, MD, Basel, Switzerland (*Presenter*) Nothing to Disclose
Carmen Zaugg, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Tujana Boldanova, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Markus Heim, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Tobias Heye, MD, Basel , Switzerland (*Abstract Co-Author*) Nothing to Disclose
Daniel T. Boll, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ricardo.donners@usb.ch

PURPOSE

To determine various quantitative parameters to be used iteratively for discrimination of liver parenchyma status, eventually creating a roadmap for an AI based algorithm differentiating different types of diffuse liver disease.

METHOD AND MATERIALS

249 multiphase CT and 119 MRI with appropriate histopathological correlation were included in this retrospective study. Histopathological diagnosis, laboratory parameters, and quantitative imaging parameters were noted for each imaging timepoint. Quantitative parameters were derived from regions of interest (ROIs) placed in the liver segment of biopsy. ADC value, T1 VIBE Dixon in- and opposed phase signal change and HU and signal intensity(SI) values on non-contrast, arterial, portalvenous and equilibrium images were noted. Contrast-enhancement-ratios were calculated from the HU or SI values between all contrast timepoints as HU/SI-timepoint1/(HU/SI-timepoint1 + HU/SI-timepoint2). Multiparametric prediction models were employed, finding optimal parameter combination to discriminate between the different states of liver parenchyma. Diagnostic accuracy was indicated by the ROC AUC.

RESULTS

For CT the algorithm used 11 dichotomous splits to identify normal parenchmya (AUC =0.90, sensitivity 82%, specificity 84%), steatosis (AUC = 0.98, sensitivity 41%, specificity 100%), steatohepatitis (AUC =0.95, sensitivity 20%, specificity 100%) and cirrhosis (AUC = 0.91, sensitivity 86%, specificity 74%). With MRI the algorithm performed 9 dichotomous splits to discriminate between normal parenchmya (AUC =0.89, sensitivity 86%, specificity 95%), steatosis (AUC = 0.95, sensitivity 71%, specificity 98%), steatohepatitis (AUC = 0.88, sensitivity 36%, specificity 100%) and cirrhosis (AUC = 0.86, sensitivity 86%, specificity 96%).

CONCLUSION

An algorithm performing multiparametric dichotomous testing, scrutinizing established quantitative CT and MRI parameters and contrast-enhancement-ratios may successfully categorize liver parenchyma and suggest underlying parenchymal disease. Simple semiquantitative dichotomous decision trees as utilized in clinical routine may not unleash the full diagnostic power of multiparametric imaging compared with automated multi-bifurcated decision trees.

CLINICAL RELEVANCE/APPLICATION

Liver cirrhosis is associated with life threatening complications. Imaging parameters identifying cirrhosis and its potentially reversible precursors will have major impact on patient management.

GI316-ED-WEB11 Spectral Detector CT Applications in Advanced Liver Imaging

Station #11

Participants
Noor Fatima Majeed, MD, Burlington, MA (*Presenter*) Nothing to Disclose
Manish Dhyani, MBBS, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Diana Murcia, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Marta Braschi Amirfarzan, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose
Christoph Wald, MD,PhD, Nahant, MA (*Abstract Co-Author*) Advisor, Koninklijke Philips NV
Jeremy R. Wortman, MD, Burlington, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

noorfatima.majeed@lahey.org

TEACHING POINTS

1. Spectral detector CT (SDCT) is a technology with a number of applications in advanced liver imaging. If appropriately utilized, this technology has the potential to improve image quality, provide new diagnostic information, and allow for decreases in radiation dose. 2. Low keV virtual monoenergetic imaging can significantly improve iodine contrast to noise ratio. This has the potential to improve detection of liver lesions, and to allow for better delineation of vascular anatomy prior to liver donation. This can also be used to decrease contrast dose. 3. Iodine selective imaging allows for direct quantification of iodine content within lesions, which can distinguish enhancement from other dense material (bone, hematoma) on post contrast acquisitions, and assess iodine content within liver tumors pre and post-treatment. 4. The use of virtual non-contrast imaging allows for potential dose reduction by eliminating the non-contrast phase in multi-phase studies.

TABLE OF CONTENTS/OUTLINE

- Overview of spectral detector CT technique and physics, and common post-processing techniques. - Case based review of applications of SDCT in advanced liver imaging. - Review of integration of SDCT into routine clinical workflow in liver imaging. - Challenges, pitfalls, and future applications.

GI317-ED-WEB12 Pancreatic Injury: Multimodality Imaging and Updated Review of Management

Station #12

Awards
Certificate of Merit

Participants
Kedar G. Sharbidre, MD, Birmingham , AL (*Presenter*) Nothing to Disclose

Ahmed M. Amer, MD, Mountain Brook, AL (*Abstract Co-Author*) Nothing to Disclose
Desiree E. Morgan, MD, Birmingham, AL (*Abstract Co-Author*) Institutional Research Grant, General Electric Company; Consultant, General Electric Company

For information about this presentation, contact:

drkedar99s@gmail.com

TEACHING POINTS

1. Pancreatic injuries comprise less than 2% of blunt trauma cases. Early diagnosis is difficult, overlooked or not readily appreciated on initial clinical examination, and missed on initial imaging studies. This results in delayed treatment associated with high morbidity and mortality. Delayed presentation or clinical deterioration may be the first clue of an underlying occult or undetected pancreatic injury. 2. Common mechanism of pancreatic injury are motor vehicle accidents, fall from height or fall of heavy objects over the abdomen, and direct assault in adults. 3. The most common site of pancreatic trauma is at the junction of the body and tail. Main pancreatic ductal injury should be carefully assessed as these are associated with delayed complications like pancreatic fistula, traumatic pancreatitis, pseudocyst formation, abscesses, and duct stricture. 4. Multiphasic CT is the modality of choice to evaluate pancreatic injuries. Portal venous phase CT is more sensitive for pancreatic ductal injuries. MRI with MRCP can be a problem solving tool in pancreatic trauma, particularly to evaluate pancreatic duct.

TABLE OF CONTENTS/OUTLINE

1. Brief anatomy of pancreas 2. Mechanism of pancreatic injury 3. Review of imaging modalities to evaluate pancreatic trauma with emphasis on CT, staging of pancreatic injury, and updated review of management.

GI314-ED-WEB13 Retroperitoneal Masses: A Pattern-Based Approach

Station #13

Participants
Bhavana Budigi, MBBS, MD, Winston-Salem, NC (*Abstract Co-Author*) Nothing to Disclose
Abdul-rahman Abualruz, MD, Winston Salem, NC (*Abstract Co-Author*) Nothing to Disclose
Michael Oliphant, MD, Winston-Salem, NC (*Abstract Co-Author*) Nothing to Disclose
Orpheus Kolokythas, MD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Rafel Tappouni, MBBCh, FRCPC, Winston Salem, NC (*Abstract Co-Author*) Consultant, Behold.AI Technologies; Medical Advisory Board, Behold.AI Technologies
Neeraj Lalwani, MD, Winston Salem, NC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

NLALWANI@WAKEHEALTH.EDU

TEACHING POINTS

Cross sectional imaging serves as a roadmap for characterization of the broad spectrum of retroperitoneal masses which can aid a clinician in the variable management of these masses. Several overlapping features of these masses tend to confuse the interpreter which results in a tendency to provide a broad differential diagnosis. We discuss a simplified classification of these masses into multiple categories that will allow a radiologist to accurately narrow the differential diagnosis based on anatomical location, imaging characteristics and spread patterns.

TABLE OF CONTENTS/OUTLINE

1. Introduction. 2. Diagnostic clues of retroperitoneal origin: beak sign, invisible organ sign, embedded organ sign, prominent feeding artery sign. 3. Pattern of spread. 4. Primary and secondary retroperitoneal masses: classification based on location, tissue characteristics; neoplastic/non-neoplastic. 5. Role of CT, MRI and nuclear medicine. 6. Characterization of different retroperitoneal masse: a) Cystic lesions b) Solid lesions: Fat containing and non fat containing lesions. 7. Descriptors: Location, origin, consistency, age/gender, tissue characteristics, clinical history, clinical laboratory clues, neoplastic/non neoplastic, vascularity, and imaging characteristics. 8. Conclusion.

GI318-ED-WEB14 Oncological Applications of Diffusion Kurtosis in the Gastrointestinal System: How, When and Why

Station #14

Participants
Lidia Alcala, MD, Jaen, Spain (*Presenter*) Nothing to Disclose
Juan A. Retamero, MD,MSc, Granada, Spain (*Abstract Co-Author*) Nothing to Disclose
Teodoro M. Noguerol, MD, Jaen, Spain (*Abstract Co-Author*) Nothing to Disclose
Roberto Garcia Figueiras, MD, PhD, Santiago De Compostela, Spain (*Abstract Co-Author*) Nothing to Disclose
Antonio Luna, MD,PhD, Jaen, Spain (*Abstract Co-Author*) Speaker, Canon Medical Systems Corporation; Speaker, Koninklijke Philips NV; Speaker, Siemens AG

For information about this presentation, contact:

l.alcala.o@htime.org

TEACHING POINTS

Describe the physical basis and technical adjustments of diffusion Kurtosis Review the clinical applications of Diffusion Kurtosis in the assessment of focal lesions of the gastrointestinal system Highlight the added value of diffusion kurtosis to clinical MRI protocol in gastrointestinal imaging

TABLE OF CONTENTS/OUTLINE

1. Introduction 2.Definition of Diffusion Kurtosis 3. Technical adjustments 3. Advanced modeling of diffusion signal decay 4. Clinical applications of Kurtosis in the gastrointestinal system - Hepatocellular carcinoma and other liver masses - Pancreatic neoplasms - Rectal carcinoma pre- and post-treatment and and detection of lymph nodes 5. Conclusions

GI313-ED-WEB15 How to Navigate Out of Complex Fistulas on Pelvic MRI

Station #15

Participants
Manohar Roda, MD, Jackson, MS (*Presenter*) Nothing to Disclose
Pardeep K. Mittal, MD, Augusta, GA (*Abstract Co-Author*) Nothing to Disclose
Frank H. Miller, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Marvell Saint-Victor, MD, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Mroda@umc.edu

TEACHING POINTS

1) How to delineate anatomical course of complex fistulas on pelvic MRI. 2) How to classify fistulas on the basis of etiology, location and grading to facilitate clinical management. 3) High resolution MRI technique with emphasis on 3D T2 Space, post contrrast T1 FS and DIffusion imaging

TABLE OF CONTENTS/OUTLINE

MRI Technique: We will discuss the importance of mulitplanar high resolution 3D-T2, T2 fat sat, post contrast T1 VIBE and diffusion imaging. Pelvic Anatomy: We will dicuss key anatomical landmarks to classify and grade pelvic fistulas . Delineating primary /secondary tracts of fistulas with empahsis on relationship to internal-external sphincters, puborectlais sling, levator ani muscle, connections with pelvic organs like anus, bowel, bladder, vagina, bladder, prostate, ovaries, scrotum, penis and exclusion of abscesses is very helpful. Sample cases: We will review fistulas related to perianal abscesses, pilonidal sinus, inflammatoty bowel disease (Crohn's/Ulcerative colitis), diverticulitis, pelvic cancers, post radiation/post surgical, post TRUS biopsy complications, sex change, ileal-anal pouch surgery and fistulas post seton placement/drainage. Summary:Dedicated MRI evaluation helps in anatomical localization, grading and treatment of fistulas to guide the sphincter/muscle sparing procedures, preserve continence and prevent recurrence.

Printed on: 10/29/20

SPAI43

RSNA AI Deep Learning Lab: Beginner Class: Classification Task (Intro)

Wednesday, Dec. 4 3:00PM - 4:30PM Room: AI Showcase, North Building, Level 2, Booth 10342

AI BR CH CT GI HN IN MR NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants

Bradley J. Erickson, MD, PhD, Rochester, MN (*Presenter*) Board of Directors, VoiceIt Technologies, LLC; Stockholder, VoiceIt Technologies, LLC; Board of Directors, FlowSigma, LLC; Officer, FlowSigma, LLC ; Stockholder, FlowSigma, LLC

Special Information

In order to get the best experience for this session, it is highly recommended that attendees bring a laptop with a keyboard, a decent-sized screen. Having a Gmail account will be helpful. Here are instructions for creating and deleting a Gmail account.

ABSTRACT

This class will focus on basic concepts of convolutional neural networks (CNNs) and walk the attendee through a working example. A popular training example is the MNIST data set which consists of hand-written digits. This course will use a data set we created, that we call 'MedNIST', and consists of images of 6 different classes: Chest X-ray, Chest CT, Abdomen CT, Head CT, Head MR and Breast MRI. The task is to identify the image class. This will be used to train attendees on the basic principles and some pitfalls in training a CNN. • Intro to CNNs • Data preparation: DICOM to jpeg, intensity normalization, train vs test • How do we choose the labels? Inconsistencies... Use Fast.AI routines to classify; Validation of results: Are the performance metrics reliable? 'Extra Credit': if there is time, explore data augmentation options, effect of batch size, training set size.

SSM08

Gastrointestinal (Liver Diffuse Disease: Iron, Fat)

Wednesday, Dec. 4 3:00PM - 4:00PM Room: E450B

BQ GI

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

FDA Discussions may include off-label uses.

Participants
Jeong Min Lee, MD, Seoul, Korea, Republic Of (*Moderator*) Grant, Bayer AG; Speaker, Bayer AG; Grant, Canon Medical Systems Corporation; Grant, Koninklijke Philips NV; Grant, General Electric Company; Grant, Guerbet SA; Speaker, Guerbet SA; Grant, Samsung Electronics Co, Ltd; Speaker, Samsung Electronics Co, Ltd; Grant, Bracco Group; Speaker, Siemens AG
Alice W. Fung, MD, Portland, OR (*Moderator*) Nothing to Disclose

Sub-Events

SSM08-01 Accuracy of Viscoelasticity Measurement Using Ultrasound Shear Wave Elastography for Assessing Histologic Parameters in Patients with Nonalcoholic Fatty Liver Disease

Wednesday, Dec. 4 3:00PM - 3:10PM Room: E450B

Participants
Katsutoshi Sugimoto, MD, PhD, Tokyo, Japan (*Presenter*) Nothing to Disclose
Hirohito Takeuchi, Tokyo , Japan (*Abstract Co-Author*) Nothing to Disclose
Takao Itoi, Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

sugimoto@tokyo-med.ac.jp

PURPOSE

To investigate the accuracy of shear wave (SW) speed (related to viscoelasticity), dispersion slope (related to viscosity), and attenuation value (related to degree of steatosis) measurements obtained using a new ultrasound (US) elastography system in assessing steatosis, inflammation, and fibrosis in patients with suspected nonalcoholic fatty liver disease (NAFLD).

METHOD AND MATERIALS

Data was collected from 74 consecutive adults who underwent liver biopsy for suspected NAFLD from April 2017 through November 2018. A US-based SW imaging system (Aplio-i800; Canon Medical Systems) was used to measure three US parameters (SW speed [m/s], dispersion slope [(m/s)/kHz], and attenuation value [dB/cm/MHz]) immediately before biopsy. The biopsy specimens were scored by 1 blinded expert pathologist according to the Nonalcoholic Steatohepatitis Clinical Research Network criteria. Diagnostic accuracy was assessed using the area under the receiver operating characteristic curve (AUROC) for the categories of steatosis, inflammation, and fibrosis. The effects of these histologic parameters on attenuation value, dispersion slope, and SW speed were evaluated by multivariable analysis.

RESULTS

With biopsy results as the reference standard, attenuation value identified patients with steatosis with AUROCs of 0.8335 for S>=S2 and 0.8090 for S=S3. Dispersion slope identified patients with inflammation with AUROCs of 0.7677 for A>=F2 and 0.9179 for A=A3. SW speed identified patients with inflammation with AUROCs of 0.7907 for F>=F1, 0.8403 for F>=F2, 0.8694 for F>=F3, and 0.9625 for F=F4. Multivariable analysis showed that steatosis significantly affected attenuation value (P<.0001), fibrosis and inflammation significantly affected dispersion slope (P=.0026 and P=.0299, respectively), and fibrosis significantly affected SW speed (P<.0001).

CONCLUSION

Prospective analysis of patients with NAFLD showed that attenuation value, dispersion slope, and SW speed were useful for assessing liver steatosis, lobular inflammation, and fibrosis, respectively, with AUROCs ranging from 0.7677 to 0.9625. Both inflammation and fibrosis affected dispersion slope.

CLINICAL RELEVANCE/APPLICATION

Three US parameters (attenuation value, dispersion slope, and SW speed) can be used to noninvasively assess the histopathologic parameters steatosis, inflammation, and fibrosis in NAFLD patients.

SSM08-02 Precision Analysis of Fat and Iron Measures in the Liver and Pancreas: Repeatability and Reproducibility Analysis Using Different Quantification Methods

Wednesday, Dec. 4 3:10PM - 3:20PM Room: E450B

Participants
Hilton M. Leao Filho, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose
Manoel S. Rocha, MD, PhD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

Claudia Oliveira, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Wanida Wanida Chua-Anusorn, Perth , Australia (*Abstract Co-Author*) Director, MagnePath Pty Ltd;
Paul Clark, Perth, Australia (*Abstract Co-Author*) Employee, MagnePath Pty Ltd Director, MagnePath Pty Ltd Stockholder, MagnePath Pty Ltd

PURPOSE

Robust methods to measure fat and R2* exist, using proton density fat fraction(PDFF)Although PDFF is accessible, there are various comercial techniques available, which may impair the longitudinal assessment of patientsThe study seeks to evaluate PDFF precision (R2* and fat) with distinct methods through examinations performed in volunteers on 3T and 1.5T scanners at different times, using the same parameters.

METHOD AND MATERIALS

30 volunteers were recruited. Participants underwent a 3TMRI exam and were re-scanned on the same scanner using the same protocol, less than 1 week apart. They were also examined at a 1.5T scanner.Protocols were the same across devices, using 3 multi-gradient echo distinct sequences (MGE) to calculate PDFF. Philips Achieva 3T and Ingenia 1.5T scanners were used with surface coils. Post-processing techniques were made by 4 different vendors in the 3T and 2 different vendors at 1.5T.All measures were performed by the same radiologist (13 years of experience), using a ROI that encompassed the whole liver and pancreas area in a single slice. The measures repeatability on the 3TMRI was assessed through the within-subject coefficient of variation and the repeatability coefficient(RC). The agreement between different methods assessment was evaluated by ICC.

RESULTS

Fat-Fraction(FF) results:LiverFF achieved excellent RC with values between 1.55-3.45%Pancreas showed good RC, albeit lower, ranging between 2.26-5.54%The ICC for 3T scans was 0.94(liver) and 0.69(pancreas) in the first scan and 0.94 and 0.6 respectively for the last.Agreement between 3T and 1,5T measures for liver was excellent with ICC of 0.94(CI95%:0.8-0.97)ICC for pancreas was good, but with wide variation, with mean of 0.86(CI95%:0.26-0.95)Results R2*:LiverR2* showed good results, with mean RC of 9.18-13.08s-1Pancreas showed a RC of 9.66-15.53ICC for 3T scans was 0.97(liver) and 0.46(pancreas) in the first acquisition and 0.96 and 0.22 respectively for the second.

CONCLUSION

The study showed excellent reproducibility and repeatability for fat and iron measures in liver, using different scanners and techniques. The performance of pancreas was lower

CLINICAL RELEVANCE/APPLICATION

The study showed excellent precision for liver deposits measure with different techniques/scanners.Pancreas assessment should be used with caution. The morphology of the gland and the ROI methodology may have contributed to this results

SSM08-03 Validation of Different Measurement Methods of Fat and R2* in the Liver: Focus on Reproducibility

Wednesday, Dec. 4 3:20PM - 3:30PM Room: E450B

Participants
Nathalia S. Mendonca, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Rafael M. Sachetin, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Virginia d. Goncalves, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Abdalla Y. Skaf, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Beatriz M. Cunha, MD, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Hilton M. Leao Filho, MD, Sao Paulo, Brazil (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

hiltonmlf@gmail.com

PURPOSE

-The development of robust methods to measure liver fat and R2*, such as proton density fat fraction (PDFF) techniques, made them the standard of care in hepatic deposit assessment. -Although PDFF is increasingly accessible, there isn't a clear rule to measure disease for a good correlation with biopsy or an acceptable variation among readers.-The study objective was to compare the correlation between readers with different experiences in abdominal imaging, using two distinct methods of measuring liver deposits, by placing regions of interest (ROI's) in the parenchyma.

METHOD AND MATERIALS

-100 consecutive patients who underwent MRI of the liver to evaluate steatosis and/or iron deposition were selected, searched retrospectively in our PACS. We include the first 100 that had an acceptable image quality with the use of a PDFF technique.-The patients were anonymized and 4 readers with different experiences in abdominal image analyse the images.Readers reviewed all exams independently using the following ROI placement rule:a) 4 circular ROI's (CR) deposited in the anterior and posterior region of the right liver lobe in different slices. 1 CR on the left liver lobe. We record the average value.b) 1 geographic ROI (GR) involving the entire liver area in a slice above the gallbladder, excluding vessels and artifact areas.-We calculate the ICC for the readers and both methods for fat and R2*. Bland-Altman plots were acquired.

RESULTS

-97 patients were included in the final analysis.-Fat deposits ranges from 1.6%-42.8%(Mean:12.6%/SD: 9.1%)-R2* ranged from 27s-1-171s-1 (Mean:52s-1/SD: 26s-1).>The ICC was very high for all readers with both analyses with the average --ICC for fat with the CR method was 0.983 (95%CI:0.977-0.988) / the GR method achieved an ICC of 0.958(95%CI:0.943-0.97).--ICC for R2* with CR was 0.983(95%CI:0.977-0.988) / the R2* with GR achieved a mean value of 0.983(95% CI:0.977-0.988).>The ICC between CR and GR also showed an excellent agreement with a mean ICC of 0.994(95% CI:0.993-0.995) for fat / and 0.992(95%CI:0.990-0.993)

CONCLUSION

- We showed an excellent correlation for hepatic iron and fat measurement between readers of different experience levels using

two distinct ROI placement methods.

CLINICAL RELEVANCE/APPLICATION

-Using either method described, one can achieve an excellent agreement between readers with different expertise levels.

SSM08-04 MRI Based Liver Iron Content Determination with Gradient EchoR2* versus Spin-Echo R2 Relaxometry

Wednesday, Dec. 4 3:30PM - 3:40PM Room: E450B

Participants
Arthur P. Wunderlich, PhD, Ulm, Germany (*Presenter*) Nothing to Disclose
Stephan Kannengiesser, Erlangen, Germany (*Abstract Co-Author*) Employee, Siemens AG
Valeria Mauro, Ulm, Germany (*Abstract Co-Author*) Nothing to Disclose
Lena Kneller, Ulm, Germany (*Abstract Co-Author*) Nothing to Disclose
Berthold Kiefer, PhD, Erlangen, Germany (*Abstract Co-Author*) Employee, Siemens AG
Meinrad J. Beer, MD, Ulm, Germany (*Abstract Co-Author*) Nothing to Disclose
Stefan A. Schmidt, MD, Ulm, Germany (*Abstract Co-Author*) Nothing to Disclose
Holger Cario, Ulm, Germany (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

arthur.wunderlich@uni-ulm.de

PURPOSE

To investigate correlation between liver iron content (LIC) determined with a reference method based on Spin-Echo (SE) vs. gradient-echo (GRE) R2*.

METHOD AND MATERIALS

117 patients suspected for liver iron overload were scanned between July 2014 and April 2018. 65 patients (25 f, 40 m, 24.5±13.1 years (mean±std.dev.), range 8.2 to 59.3 years) were assigned to the study group analyzed by two observers, the other 52 patients (26 f, 26 m, age 19.1±14.6 (mean±std.dev.), range 2 to 60.6 years) served as control group. All patients were examined on a 1.5 T MRI scanner (MAGNETOM Avanto, Siemens Healthcare, Erlangen, Germany). For the Ferriscan® method (Resonance Health, Burswood, Australia), transversal liver slices were acquired during free breathing using the appropriate protocol (five TEs ranging from 6 to 18 ms, single-echo acquisitions, eleven 5 mm thick slices, 100% gap, resolution 1.64x1.64 mm, acquisition time 16:20 min.). Results served as LIC reference values. With a prototype breath-hold GRE sequence, 40 partitions of 4 mm thickness at 2.5x2.5 mm voxel size were acquired in 18 sec. with parallel imaging in both phase and slice encoding direction, and in-line voxel-wise R2* calculation considering fat/water signal modulation. To obtain liver mean R2* values, regions of interest were manually placed in tissue free of vessels and/or artifacts. R2* was linearly correlated to reference LIC values. Results of the study group were used to calculate LIC for control group patients, further referred to as GRE-LIC. GRE-LIC was compared to reference LIC values.

RESULTS

Study group LIC values ranged from 0.5 to 27.3 mg/g liver dry wt. Linear correlation to R2* was excellent with coefficient of determination (R2) of 0.9. Slope values were 0.039±0.00016 mg*s/g and intercept was -0.85±0.38 mg/g. Observer results were identical within the confidence interval. For the control group, GRE-LIC values showed near-ideal concordance to LIC reference values with regression line close to identity (slope 1.04±0.05, intercept -0.64±0.83), R2 was 0.89.

CONCLUSION

Linear correlation of R2* to reference LIC in th e study group and concordance of LIC values determined from GRE to reference LIC values in the control group were both excellent. Also, we found good inter-observer agreement.

CLINICAL RELEVANCE/APPLICATION

The volumetric single breath-hold GRE sequence studied is suitable for reliable MR-based LIC determination.

SSM08-05 Multi-Point Dixon PDFF MRI for Fat Quantification: Cross Vendor and Field Strength Assessment

Wednesday, Dec. 4 3:40PM - 3:50PM Room: E450B

Participants
Erika Schneider, PhD, Cleveland, OH (*Presenter*) Stockholder, General Electric Company Stockholder, Pfizer Inc Stockholder, NitroSci Pharmaceuticals, LLC
Erick M. Remer, MD, Beachwood, OH (*Abstract Co-Author*) Travel support, Bracco Group
Xiaobo Ding, MD,MD, Changchun , China (*Abstract Co-Author*) Nothing to Disclose
Bryan Addeman, Toronto, ON (*Abstract Co-Author*) Nothing to Disclose
Charles A. McKenzie, PhD, London, ON (*Abstract Co-Author*) Research Grant, General Electric Company
Sankar D. Navaneethan, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Nancy A. Obuchowski, PhD, Cleveland, OH (*Abstract Co-Author*) Research Consultant, Siemens AG; Research Consultant, IBM Corporation; Research Consultant, Elucid Bioimaging Inc; Research Consultant, FUJIFILM Holdings Corporation

For information about this presentation, contact:

remere1@ccf.org

PURPOSE

To assess multi-point Dixon (PDFF) using multiple platforms for accuracy and reproducibility of fat quantification.

METHOD AND MATERIALS

Fat-water phantom sets (0, 10, 16, 35, 100 % fat) were evaluated using FDA-approved PDFF sequences, reconstruction and

analysis algorithms. Phantoms were imaged with subjects in the Visceral Adiposity and Physical Fitness in CKD study on 2 Siemens 3T Skyra, 1 Siemens 3T Prisma, 1 Siemens 1.5T Avanto, 1 GE Discovery 3T MR750, and 1 Philips 3T Ingenia systems. Technical performance metrics include cross-sectional bias (by weight), bias, linearity and reproducibility for the entire study, for each site, for each manufacturer and field strength.

RESULTS

392 subjects were scanned with phantoms on Siemens 1.5T (105), Siemens 3T (140), Philips 3T (68) and GE 3T (88). Overall, a linearity relationship was observed with negligible quadratic value and slope of 0.94 (95% CI: 0.938, 0.947). Mean bias was -3.8%, 1.5%, 1.8%, 0.3% and 2.4% for 100%, 35%, 16%, 10% and 0% fat fraction, with reproducibility standard deviation of 2.6%, 5.0%, 3.4%, 2.5% and 2.8% respectively. The mean bias differed significantly by vendor ($p<0.001$) and field strength ($p<0.001$). Siemens had the lowest overall bias and GE the highest. The bias was higher for field strength of 1.5T. Reproducibility differed by vendor ($p=0.021$) and field strength ($p=0.015$). Better precision (i.e. lower variance, thus higher reproducibility) was observed for GE, and worst precision (higher variance, thus poorer reproducibility) for Siemens. A field strength of 1.5T had better precision.

CONCLUSION

In general, PDFF is an excellent method of quantifying fat in vivo and is stable over time and across all fat fractions. However, the PDFF measurement is biased; slightly overestimated when the PDFF value is small and underestimated at higher PDFF values. The reproducibility coefficient (RDC) or %fat difference of 11.2% or larger, indicating a true difference when measured on different MR system vendors and field strengths and at different time points.

CLINICAL RELEVANCE/APPLICATION

Multi-point Dixon PDFF can quantify body fat accurately, however specific cutoffs for disease classification requires additional work and may depend upon vendor and field strength.

SSM08-06 Accuracy of Energy Spectrum CT Lipid Base Value in Quantitative Analysis of Non-Alcoholic Fatty Liver

Wednesday, Dec. 4 3:50PM - 4:00PM Room: E450B

Participants
Min Zhang, , China (*Presenter*) Nothing to Disclose
Nan Yu, MD, Xianyang, China (*Abstract Co-Author*) Nothing to Disclose
Jianying Li, Beijing, China (*Abstract Co-Author*) Employee, General Electric Company
Ma Chunling, MMed, Xianyang City, China (*Abstract Co-Author*) Nothing to Disclose
Lei Yuxin, MMed, Xianyang City, China (*Abstract Co-Author*) Nothing to Disclose
Lihua Fan, Xian Yang, China (*Abstract Co-Author*) Nothing to Disclose
Chuangbo Yang, MMed, Xianyang City, China (*Abstract Co-Author*) Nothing to Disclose
Yongjun Jia, MMed, Xianyang, China (*Abstract Co-Author*) Nothing to Disclose
Dong Han, MD, Xianyang, China (*Abstract Co-Author*) Nothing to Disclose
Wanqiong Wang, Xianyang, China (*Abstract Co-Author*) Nothing to Disclose
Mengting Yu, Shaanxi, China (*Abstract Co-Author*) Nothing to Disclose
Yue Gao, Xianyang city, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

15596757635@163.com

PURPOSE

the accuracy of quantitative analysis and diagnosis of non-alcoholic fatty liver was assessed by comparing energy spectrum CT lipid matrix with magnetic resonance lipid matrix using magnetic resonance Q-dixon technique as a reference standard.

METHOD AND MATERIALS

Retrospective collection of patients who underwent both magnetic resonance quantitative Q-dixon sequence scan and energy spectrum CT scan within one week. After image acquisition, the average fat content of liver was quantitatively analyzed by placing region of interest (ROI). The method of sketching is to select ROI of two different hepatic lobes at the hepatic portal level, and one ROI from the hepatic portal level to the upper and lower levels, respectively, to record the liver fat fraction (FF) of each hepatic segment. Finally, the average fat fraction of the whole liver is obtained by the average method. Two doctors with rich experience in imaging diagnosis of liver diseases independently measured the lipid matrix and the corresponding ratio of liver to spleen on energy spectrum CT. The results were examined by a deputy director of imaging specialty. Finally, the differences among the groups were compared, and the correlation of MR fat fraction, fat matrix and liver-spleen ratio was analyzed. The diagnostic efficacy of energy spectrum CT fat matrix for mild fatty liver was tested by ROC curve.

RESULTS

This study total 80 cases. There was a positive correlation between FF on energy spectrum CT ($r = 0.959$, $P = 0.000$), and a negative correlation between liver-spleen ratio and fat fraction ($r=-0.848$, $P = 0.000$), as shown in Figures 1 and 2. ROC curve analysis showed that the sensitivity, specificity, cut-off point and area under curve were 95%, 100%, 351.19 and 0.990 respectively in the light fatty liver group, as shown in Figure 3.

CONCLUSION

Clinical evaluation of non-alcoholic fatty liver can refer to the fat content measured by CT fat matrix (the cut-off value is 351.19), and its correlation with the fat content measured by Q-dixon of 3.0T magnetic resonance is better than that measured by CT liver-spleen ratio. Energy spectrum CT lipid matrix can be used to quantitatively evaluate non-alcoholic fatty liver and has a good diagnostic effect for mild fatty liver.

CLINICAL RELEVANCE/APPLICATION

The fat concentration measurement in spectral CT can replace the Liver-Spleen CT Ratio as an imaging method for the diagnosis of fatty liver, and its accuracy is high.

Printed on: 10/29/20

SSM09

Gastrointestinal (Pancreas Focal Disease)

Wednesday, Dec. 4 3:00PM - 4:00PM Room: E351

GI

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

Participants
David M. Hough, MD, Rochester, MN (*Moderator*) Nothing to Disclose
Hina Arif Tiwari, MD, Tucson, AZ (*Moderator*) Nothing to Disclose

Sub-Events

SSM09-01 Detection of Pancreatic Ductal Adenocarcinoma and Liver Metastases: Comparison of Contrast-Enhanced MR Imaging with Hepatobiliary versus Extracellular Contrast Materials

Wednesday, Dec. 4 3:00PM - 3:10PM Room: E351

Participants
Yoshifumi Noda, MD,PhD, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose
Satoshi Goshima, MD, PhD, Hamamatsu City, Japan (*Abstract Co-Author*) Nothing to Disclose
Yukiko Takai, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose
Shoma Nagata, MD, Gifu, Japan (*Presenter*) Nothing to Disclose
Nobuyuki Kawai, MD, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroshi Kawada, MD, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose
Yukichi Tanahashi, MD, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose
Masayuki Matsuo, MD, Gifu, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To compare the detectability of pancreatic ductal adenocarcinoma (PDAC) and liver metastases between contrast-enhcanced magnetic resonance (MR) imaging with hepatobiliary and extracellular contrast materials (ECCMs).

METHOD AND MATERIALS

Two hundred seventy-two patients with suspected of having a pancreatic disease underwent contrast-enhanced MR imaging with Gd-EOB-DTPA (EOB group, *n = 79) or ECCMs (ECCM group, n = 193). The ECCMs included Gd-DTPA (n = 158), Gd-BT-DO3A (n = 28), Gd-DOTA (n = 5), and Gd-DTPA-BMA (n = 2). The signal intensities of pancreatic parenchyma, paraspinal muscle, PDAC if present, and background noise were measured, and then the signal intensity ratio (SIR) of the pancreas and tumor-to-pancreas contrast-to-noise ratio (CNR) were calculated. The conspicuity of PDAC was evaluated on the pancreatic parenchymal phase images, and that of liver metastases, if present, was also evaluated in all sequences. Qualitative and quantitative parameters were compared between EOB and ECCM groups.*

RESULTS

The SIR of the pancreas (P = 0.30) and CNR (P = 0.46) were comparable between EOB and ECCM groups. The sensitivity (97.1% vs 93.5%, P = 0.42) and specificity (100.0% vs 99.2%, P = 1.00) for the detection of PDAC were comparable between EOB and ECCM groups. In the lesion-by-lesion analysis, EOB group showed significantly greater sensitivity for detecting liver metastases compared with ECCM group (95.0% vs 84.5%, P = 0.04).

CONCLUSION

Gd-EOB-DTPA-enhanced MR imaging with was comparable with ECCMs-enhanced MR imaging in detecting PDAC and demonstrated better sensitivity in detecting liver metastases.

CLINICAL RELEVANCE/APPLICATION

Gd-EOB-DTPA-enhanced MR imaging is all that is needed to examine patients with PDAC and contribute to the reduction of medical costs.

SSM09-02 *The Stiffness as Obtained by Magnetic Resonance Elastography Correlates with the Stroma Proportion and Prognosis of Resectable Pancreatic Adenocarcinoma (PDAC)*

Wednesday, Dec. 4 3:10PM - 3:20PM Room: E351

Participants
Shi Yu, MS, Shenyang, China (Presenter) Nothing to Disclose
Xianyi Zhang, Shenyang , China (Abstract Co-Author) Nothing to Disclose
Qiyong Guo, MD, Shenyang, China (Abstract Co-Author) Nothing to Disclose

For information about this presentation, contact:

18940259980@163.com

PURPOSE

Abundant stroma is one of the most important features of PDAC that accounts for up to 90% of the tumor volume. The role of MRE in the prognostic prediction of PDAC remains unknown. Herein, our study was to investigate the value of the MRE-determined stiffness in evaluating the stroma proportion and the prognostic value of stiffness in resectable PDAC.

METHOD AND MATERIALS

A total of 146 resected PDAC patients were prospectively enrolled in this study from Jan 2016 to Dec 2018, all without preoperative chemotherapy or radiotherapy. Both sirius-red staining and H&E staining was used to evaluate the stromal proportion in PDAC. MRE examinations were performed on a 3.0T MR scanner (Signa HDX 3.0T system; GE Healthcare, Milwaukee).The imaging parameters were as follows: frequency=40Hz; TR/TE = 1375/38.8ms; phase offsets = 3; FOV = 40 cm; matrix = 96×96; number of signal averages = 1; frequency-encoding direction = RL; parallel imaging acceleration factor = 3; number of slices = 32; thickness = 3.5mm. Survival rates were calculated according to the Kaplan-Meier method and were compared using the log rank test. Multivariate analysis was performed with a Cox regression model.

RESULTS

PDAC showed significantly higher stiffness (3.11±0.61 kPa) than that of the non-tumor pancreatic parenchyma (1.22±0.24 kPa) (P<0.001). The average stromal proportion was 43.7±22.5%. The pancreatic stiffness was positively associated with the stromal proportion of resected PDAC (r= 0.811, P < 0.001). The pancreatic stiffness was also positively correlated with T stage and AJCC stage (AJCC 7th edition) (r= 0.713 and 0.692,both P < 0.001). High pancreatic stiffness (>3.19kPa) predicted unfavorable overall survival (OS) relative to low pancreatic stiffness (21.6 vs. 38.2 months, P= 0.011). The pancreatic stiffness was an independent prognostic factor for resected PDAC based on multivariate analysis (hazard ratio =5.174, 95%CI:2.41-11.07 P <0.001).Figure 1 showed 2 PDAC cases with 17% and 74% different stroma proportions as examples, respectively.

CONCLUSION

We demonstrated that the pancreatic stiffness obtained by MRE was positively associated with the stroma proportion in pancreatic cancer. Pancreatic stiffness can be a promising biomedical index for prognostic prediction in PDAC.

CLINICAL RELEVANCE/APPLICATION

MRE is a simple, fast and promising sequence that can be added in clinical routine pancreatic MR protocol, so as to help evaluate the stroma proportion of tumor and predict the prognosis of resectable PDAC for patients.

SSM09-03 Pancreatic Screening in High Risk Patients: Is Fast Non-Contrast MRI Protocol Feasible? A Proposal

Wednesday, Dec. 4 3:20PM - 3:30PM Room: E351

Participants
Francesca Maio, MD, Napoli , Italy (Presenter) Nothing to Disclose
Vincenzo Pasqualino, Padova, Italy (Abstract Co-Author) Nothing to Disclose
Luca Bertana, MD, Rome, Italy (Abstract Co-Author) Nothing to Disclose
Silvia Venturini, Treviso, Italy (Abstract Co-Author) Nothing to Disclose
Valeria Cantoni, Napoli, Italy (Abstract Co-Author) Nothing to Disclose
Michele C. Fusaro, Treviso, Italy (Abstract Co-Author) Nothing to Disclose
Giovanni Morana, MD, Treviso, Italy (Abstract Co-Author) Speakers Bureau, Bracco Group

For information about this presentation, contact:

francescamaio9@gmail.com

PURPOSE

To validate a non-contrast fast MRI protocol for high risk patients as a screening tool to detect pancreatic cancer (PC) in its earliest phase, compatible with an R0 resection.

METHOD AND MATERIALS

200 patients (>40yo) were selected from our radiological database. 100 were negative for pancreatic lesions, 50 were positive for cystic lesions and 50 were positive for solid lesions; all lesions were smaller than 28mm. Three readers with a high, medium and low experience analysed selected MRI sequences (single-shot T2w breath-hold on axial and coronal plans, GE T1w FS on axial plan, DWI and 2D/3D MRCP) independently, randomly and anonymously. Readers identified or excluded the presence of pancreatic lesion. Results of reading session were compared with the final diagnosis and divided into five different classes of lesion: cystic, solid (all), adenocarcinoma, PNET and solid excluding PNET; Mcnemar's test was used to compare. Inter-observer agreement was determined according to the kappa statistic.

RESULTS

All readers showed high sensitivity and NPV in the identification of ADK (R1 100%-100%, R2 89%-98% and R3 83%-97%), with a good agreement to detect pancreatic lesions (k=0.52), especially ADK (k=0.82), PNET (>10mm) (k=0.70) and cystic lesions(k=0.87).

CONCLUSION

A non-contrast fast MRI protocol can be proposed as a screening tool in high risk patients for PC, reducing the time lapse between the controls, giving more chances for an early diagnosis with a better outcome.

CLINICAL RELEVANCE/APPLICATION

Fast MR protocol is able to detect small pancreatic lesions with high sensitivity and it can be used as a screening tool in high risk patients for pancreatic cancer, in order to achieve an early diagnosis and thus a better survival

SSM09-04 Relationship between Radiomics and Risk of Lymph Node Metastasis in Pancreatic Ductal Adenocarcinoma

Wednesday, Dec. 4 3:30PM - 3:40PM Room: E351

Participants
Yun Bian, Shanghai, GA (Presenter) Nothing to Disclose
Jianping Lu, MD, Shanghai, China (Abstract Co-Author) Nothing to Disclose
Xu Fang, Shanghai, China (Abstract Co-Author) Nothing to Disclose

For information about this presentation, contact:

bianyun2012@foxmail.com

PURPOSE

To explore the exact relationship between the arterial radiomics score (rad-score) and lymph node (LN) metastasis in pancreatic ductal adenocarcinoma (PDAC).

METHOD AND MATERIALS

A total of 225 patients with pathologically confirmed PDAC who underwent multislice computed tomography within one month of resection from December 2016 to August 2017 were retrospectively studied. For each patient, 1029 radiomics features of arterial phase were extracted, which were reduced using the least absolute shrinkage and selection operator (LASSO) logistic regression algorithm. Multivariate logistic regression models were utilized to analyze the association between the arterial rad-score and LN metastasis.

RESULTS

LN-negative and -positive patients accounted for 107 (47.56%) and 118 (52.44%) of the cohort, respectively. The rad-score, which consisted of 12 selected features of the arterial phase, was significantly associated with LN status (P<0.05). Univariate analysis revealed that the arterial rad-score and T stage were independently and positively associated with risk of LN metastasis (P<0.05). Stratified analysis showed that the impact of the arterial rad-score on LN metastasis was not affected by age, sex, BMI, CA19-9 level, tumor location, T stage, or grade of differentiation (P for interaction>0.05). The trend of increasing the arterial rad-score with higher likelihood of LN metastasis among age <59 years and >=66 years, sex, BMI, CA19-9 higher than 37ug/L, location, T2-4 stage and Well-moderately differentiation grade (P for trend <0.05). Multivariate analyses revealed a significant association between the arterial rad-score and the LN metastasis (p < 0.0001). Higher arterial rad-score was associated with LN metastasis (P for trend <0.0001).

CONCLUSION

The arterial rad-score is independently and positively associated with the risk of LN metastasis in PDAC.

CLINICAL RELEVANCE/APPLICATION

the arterial rad-score has significant association with the risk of LN metastasis in PDAC . A higher arterial rad-score is associated with a higher risk for LN metastasis. Thus, radiomics analysis may be a promising noninvasive method for assessment of LN metastasis.

SSM09-05 Time-intensity Curve Analysis of Endoscopic Contrast-Enhanced Ultrasound Can Help Discriminate Adenocarcinoma from Focal Pancreatitis

Wednesday, Dec. 4 3:40PM - 3:50PM Room: E351

Participants
Bino A. Varghese, PhD, Los Angeles, CA (Abstract Co-Author) Nothing to Disclose
James Buxbaum, MD, Los Angeles, CA (Abstract Co-Author) Nothing to Disclose
Christopher Ko, Los Angeles, CA (Abstract Co-Author) Nothing to Disclose
Kevin G. King, MD, La Crescenta , CA (Abstract Co-Author) Nothing to Disclose
Ara Sahakian, Los Angeles, CA (Abstract Co-Author) Nothing to Disclose
Jessica Serna, Los Angeles, CA (Abstract Co-Author) Nothing to Disclose
Alice A. Lee, Los Angeles, CA (Abstract Co-Author) Nothing to Disclose
Tanmay Deshmukh, Los Angeles, CA (Abstract Co-Author) Nothing to Disclose
Shuchi Sehgal, Baltimore, MD (Abstract Co-Author) Nothing to Disclose
Bhushan Desai, MBBS, MS, Los Angeles, CA (Abstract Co-Author) Nothing to Disclose
Phillip M. Cheng, MD, MS, Culver City, CA (Abstract Co-Author) Nothing to Disclose
Vinay A. Duddalwar, MD,FRCR, Los Angeles, CA (Presenter) Research Grant, Samsung Electronics Co, Ltd Advisory Board, DeepTek Consultant, Radmetrix

For information about this presentation, contact:

bino.varghese@med.usc.edu

PURPOSE

To evaluate the role of endoscopic contrast;enhanced ultrasound (CEUS) based time-intensity curve (TIC) analysis metrics in discriminating pancreatic ductal adenocarcinoma from focal pancreatitis.

METHOD AND MATERIALS

In this IRB approved study, we evaluated 13 patients with histopathology confirmed adenocarcinoma and 4 patients with focal pancreatitis. TIC were extracted from CEUS cine clips of focal pancreatic lesions following injection of 0.3 cc bolus of agitated perflutren lipid microspheres. The cine clips contained perfusion information for a minimum of 2mins post-injection and terminated once the characteristics enhancement patterns were obtained. 5mm circular ROI's were placed on the lesion by an experienced EUS expert and Intensity of contrast enhancement measured as an average were recorded from each image of the cine clip The ROIs were placed over homogenous regions of the lesion. In addition, surrounding normal tissue was used as a reference control). Using a customized MATLAB program, quantitative TIC analysis was performed on the extracted contrast-enhancement curves. Independent t-test was used to conduct exploratory univariate analysis of the TIC metrics to discriminate between lesion types and normal tissue and also to discriminate between lesion types. A significance threshold of 0.05 was used.

RESULTS

Among, the various TIC metrics, relative peak enhancement (PE) had the greatest utility to discriminate pancreatic ductal adenocarcinoma (PDAC) from focal pancreatitis. PDAC showed a significantly (p=0.003) lower PE of 0.46±0.22 compared to 0.99±0.27 for focal pancreatitis.

CONCLUSION

TIC analysis is a valuable evaluation tool for discriminating PDAC from focal pancreatitis which is a diagnostic dilemma.

CLINICAL RELEVANCE/APPLICATION

Improved differential diagnosis based on better discrimination of indeterminate solid pancreatic lesions will provide patient-specific care-management options.

SSM09-06 Incidental Multiple Intraductal Papillary Mucinous Neoplasms (IPMN): Imaging Findings that Predict Growth on Long-Term Follow-Up

Wednesday, Dec. 4 3:50PM - 4:00PM Room: E351

Participants
Roya Rezvani Habibabadi, Baltimore, MD (Presenter) Nothing to Disclose
Mohammadreza Shaghaghi, MD, Baltimore, MD (Abstract Co-Author) Nothing to Disclose
Maryam Ghadimi, MD, Baltimore, MD (Abstract Co-Author) Nothing to Disclose
Pegah Khoshpouri, MD, Baltimore, MD (Abstract Co-Author) Nothing to Disclose
Pallavi Pandey, MD, Baltimore, MD (Abstract Co-Author) Nothing to Disclose
Sanaz Ameli, MD, Baltimore, MD (Abstract Co-Author) Nothing to Disclose
Bita Hazhirkarzar, MD, Baltimore, MD (Abstract Co-Author) Nothing to Disclose
Mounes Aliyari Ghasabeh, MD, Baltimore, MD (Abstract Co-Author) Nothing to Disclose
Ankur Pandey, MD, Baltimore, MD (Abstract Co-Author) Nothing to Disclose
Ihab R. Kamel, MD, PhD, Baltimore, MD (Abstract Co-Author) Research Grant, Siemens AG

For information about this presentation, contact:

rrezvan3@jhmi.edu

PURPOSE

To assess growth rate of incidental IPMNs on long-term imaging follow-up and to evaluate the association between baseline imaging features and rate of growth.

METHOD AND MATERIALS

This IRB-approved, retrospective study included incidental multiple IPMNs (diameter>=4mm); with baseline cross-sectional imaging between 2002-2015, and follow-up imaging performed at least 12 months apart. In each patient, up to five of the largest cysts were identified and measured at baseline and last follow-up. For IPMNs demonstrating size change, the estimated time to growth was determined by reviewing all the intermediate imaging. Cysts' growth was determined based on ACR criteria. For each cyst, location, cluster or solitary presentation, dominancy, and other characteristics of the background pancreas were determined. A cluster was defined as presence of >3 cysts in one anatomic location of pancreas. A cyst was defined as dominant when it was >50% larger than the second largest cyst in the pancreas. The association with growth was adjusted with time intervals using univariate Cox analysis.

RESULTS

95 cysts in 31 patients were followed for a median of 56 months (range, 12-170 months). The mean cyst growth rate was 0.46 mm/year. According to ACR-criteria, 22 cysts (24%) grew, 14 cysts (15%) decreased in size and 59 cysts (62%) remained stable on follow-up imaging. The median time to growth was 55 months (range, 12-133 months).13 cysts (14%) were identified as dominant. 44 cysts (46 %) were located in a cluster as compared to 51cysts (54%) with a solitary presentation. Clustered presentation was found to have significant association with occurrence and rate of growth in IPMNs (HR, 3.4; P= 0.035 & Coef, 0.59; p=0.002, respectively).

CONCLUSION

Clustered presentation was independently associated with growth in multiple IPMNs. This could be due to the presence of underlying pathology in a focal region of pancreas. Measuring the largest cyst may not be adequate in representing size change in all other cysts and other features of multiplicity need to be considered in multiple IPMNs surveillance.

CLINICAL RELEVANCE/APPLICATION

There is no specific recommendation regarding long-term follow-up in patients with multiple IPMNs. Our data might be useful for developing a more specific surveillance strategy for multiple IPMNs with regards to choosing the targeted cyst and identifying predictive parameters.

SSM10

Gastrointestinal (DECT Technique)

Wednesday, Dec. 4 3:00PM - 4:00PM Room: E352

CT GI

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

FDA Discussions may include off-label uses.

Participants
Amir Borhani, MD, Chicago, IL (*Moderator*) Author, Reed Elsevier
Desiree E. Morgan, MD, Birmingham, AL (*Moderator*) Institutional Research Grant, General Electric Company; Consultant, General Electric Company
Huadan Xue, MD, Beijing, China (*Moderator*) Nothing to Disclose

Sub-Events

SSM10-01 Standardization of Dual-Energy CT Iodine Uptake of the Abdomen: Defining Reference Values in a Big Data Cohort

Wednesday, Dec. 4 3:00PM - 3:10PM Room: E352

Participants
Ibrahim Yel, MD, Frankfurt, Germany (*Presenter*) Nothing to Disclose
Christian Booz, MD, Frankfurt am Main, Germany (*Abstract Co-Author*) Speaker, Siemens AG
Simon S. Martin, MD, Charleston, SC (*Abstract Co-Author*) Institutional Research support, Siemens AG
Lukas Lenga, Frankfurt, Germany (*Abstract Co-Author*) Nothing to Disclose
Thomas J. Vogl, MD, PhD, Frankfurt , Germany (*Abstract Co-Author*) Nothing to Disclose
Moritz H. Albrecht, MD, Charleston, SC (*Abstract Co-Author*) Speaker, Siemens AG
Carlo N. De Cecco, MD, Atlanta , GA (*Abstract Co-Author*) Research Grant, Siemens AG
Benjamin Kaltenbach, MD, Kelkheim, Germany (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

dr.ibrahimyel@gmail.com

PURPOSE

Despite a wealth of literature on dual-energy CT(DECT) iodine uptake in various pathologies, physiologic reference values for this technique for confident clinical application have not been defined to date. Therefore,we investigated the iodine uptake of healthy abdominal and pelvic organs in a big data cohort.

METHOD AND MATERIALS

Consecutive portal-venous abdominal DECTs were reviewed and unremarkable exams were included (n=520; white/asian=489; mean age=59±15,5 years; 265w/255m). ROI-measurements were performed in the following anatomical regions (number of ROIs): liver(9), pancreas(3), spleen(3), adrenal glands(2), kidneys(6), prostate(4), uterus(2), urinary bladder wall(1) and lymph nodes (3). Iodine uptake was compared among different organs and subgroup analysis was performed (young vs old/male vs female).

RESULTS

Overall mean iodine uptake values were as followed (mg/ml): liver=1.93±0.54, pancreas=2.06±0.57, spleen=2.55±0.65, adrenal glands=1.66±0.43, kidneys=6.28±1.36, prostate=1.11±0.52, uterus=1.07±0.74, bladder=0.69±0.29 and lymph nodes=0.75±0.21. Portal-venous iodine uptake was comparable between liver/pancreas and liver/adrenal glands (p>=0.119). Women showed higher iodine uptake for liver (2.07±0.58 vs 1.79±0.45mg/ml), pancreas (2.29±0.57 vs 1.83±0.47mg/ml), spleen (2.81±0.65 vs 2.30±0.53mg/ml), adrenal glands (1.76±0.49 vs 1.56±0.33mg/ml) and kidneys (6.74±1.36 vs 5.83±1.20mg/ml) than men(p<0.001). In older patients,iodine uptake increased for liver (1.98±0.52 vs 1.87±0.54mg/ml), spleen (2.48±0.65 vs 2.63±0.64mg/ml) and kidneys (6.11±1.24 vs 6.45±1.45mg/ml) compared to younger subjects (p<=0.040). Only the uterus showed lower values in older women (0.77±0.45 vs 1.35±0.84mg/ml, p<0.001).

CONCLUSION

Physiologic iodine uptake values show age- and gender-related differences for the liver, spleen and kidneys. Pancreas and adrenal glands show higher iodine perfusion in women. While prostate parenchyma seems unaffected throughout lifetime, iodine supply of the uterus decreases in elderly women. Lymph nodes and bladder are unaffected by demographic influences.

CLINICAL RELEVANCE/APPLICATION

We defined physiologic reference values for static perfusion of abdominal organs, as indicated by DECT iodine uptake in a big data cohort and described the related differences regarding age and gender, in order to facilitate more reliable clinical application of this technique and ultimately, potential implementation in future guidelines.

SSM10-02 Texture Analysis of Split-Filter DECT Virtual Monoenergetic Images of Pancreas and Liver Tumors and Healthy Tissue

Wednesday, Dec. 4 3:10PM - 3:20PM Room: E352

Participants
Lianna di Maso, Madison , WI (*Presenter*) Nothing to Disclose
Jessie Huang, PHD, Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Michael Lawless, PHD, Madison, WI (*Abstract Co-Author*) Nothing to Disclose
Larry A. Dewerd, PhD, Madison , WI (*Abstract Co-Author*) Stockholder, Standard Imaging, Inc
Jessica Miller, PhD, Madison, WI (*Abstract Co-Author*) Research Grant, Siemens AG

For information about this presentation, contact:

dimaso@wisc.edu

PURPOSE

The purpose of this work is to investigate the effect of energy on CT texture analysis (CTTA) of pancreas and liver tumors and healthy tissue using virtual monoenergetic images (VMIs) generated from split-filter dual-energy CT (DECT).

METHOD AND MATERIALS

Split-filter DECT data was acquired for pancreatic and liver cancer patients using the Siemens SOMATOM Definition Edge CT scanner for radiation treatment planning with 100 ml of iodinated contrast medium. VMIs at energies ranging from 40-90 keV in 5 keV increments were reconstructed in Siemens' Syngo.via (VB30) software. Based on radiation oncologist reviewed contours of tumor and healthy tissue, first order CTTA parameters of the pancreas and liver tumor and healthy tissue were extracted from MIMvista including mean CT number (MCTN), standard deviation (SD), skewness, and kurtosis. Statistical analysis was performed using ANOVA.

RESULTS

Among the CTTA parameters investigated, MCTN and SD showed a statistically significant decrease with increasing energy of VMIs for pancreas and liver tumor and healthy tissue ($p<0.0001$). On the other hand, skewness and kurtosis did not change with energy of VMIs for pancreas and liver tumor and healthy tissue ($p>0.7$). There was a statistically significant difference in MCTN between pancreas and liver tumor and healthy tissue for low-energy VMIs ($p<0.04$). Although kurtosis did not change with energy, there was a statistically significant difference between the kurtosis of pancreas tumor and healthy tissue for all VMIs investigated ($p<0.05$). This trend was not apparent for liver tumor and corresponding healthy tissue ($p>0.14$). Additionally, there was a statistically significant difference in SD between pancreas tumor and healthy tissue for all VMIs investigated ($p<0.04$). This trend was not apparent for the liver cases ($p>0.08$).

CONCLUSION

The energy of split-filter VMIs has no impact on skewness or kurtosis of pancreas and liver tumor and healthy tissue. The difference in MCTN between pancreas tumor and healthy tissue is greatest for low-energy split-filter VMIs. Kurtosis determined from split-filter VMIs was different between pancreas tumor and healthy tissue.

CLINICAL RELEVANCE/APPLICATION

Skewness and kurtosis are reliable CTTA parameters that do not change as a function of energy. MCTN, SD and kurtosis have the potential to differentiate tumor and healthy tissue on split-filter VMIs. These results can be used as a baseline for higher-order CTTA of pancreas and liver tumor and healthy tissue.

SSM10-03 Quantification of the Liver-Fat Content Using Multimaterial Decomposition (MMD) Algorithm and Material Decomposition Technique: A Vitro Experiment Study

Wednesday, Dec. 4 3:20PM - 3:30PM Room: E352

Participants
Tingting Xie JR, MD, Shenzhen, China (*Presenter*) Nothing to Disclose
Guanxun Cheng, MD,PhD, Shenzhen, China (*Abstract Co-Author*) Nothing to Disclose
Ying Guo, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ttxietinarsna@163.com

PURPOSE

Our first goal was to build in vitro liver-fat model to provide a phantom for fat content quantification in study. The second goal was to evaluate the difference of feasibility and accuracy of using MMD algorithm and dual energy CT material decomposition technique for fat content quantification to provide a basis for the precise fat quantification in clinical use.

METHOD AND MATERIALS

A total of 6 homogeneous liver-fat mixed samples with various fat volume contents from 0-50% (with an interval of 10%). Scanned by GE Revolution CT scanner using GSI mode with rapid tube voltage switching between 80-140 kVp. After the CT scan, reconstructed imaging data were processed with GSI imaging analysis software and MMD soft-ware currently not commercially available. Fat concentration (on fat-water bases) measured with consistent ROIs placed in the tube center. Each sample was recorded at 4 different regions for average and statistical analysis. A linear regression was performed using SPSS 19.0 software to analyze the relationship between the measured fat concentration and the actual fat concentration. P value less than 0.05 was considered to indicate a linear correlation.

RESULTS

(1) We had successfully developed the model in vitro for fat content quantification. With the designed concentration series, the gradient range covered clinical fat content in different body regions. And the model provided a novel way to investigate in vitro fat content. (2) Both algorithms showed good linear relationship between the measured fat concentration and actual concentration. MMD algorithm revealed a linear correlation equation of $y=1.498x-73.5$, $R^2 = 0.944$, $P=0.001$, $F=84.748$. For material decomposition technique, the linear correlation equation was $y=0.079x+30.52$, $R^2 = 0.983$, $P=0.001$, $F=234.397$.

CONCLUSION

Both of MMD algorithm and spectral CT material decomposition technique were demonstrated to provide accurate and reliable measurement of fat content for liver-fat model, which will contribute to the development of clinical fat content quantification assays.

CLINICAL RELEVANCE/APPLICATION

This study demonstrated the feasibility of using MMD algorithm and material decomposition techniques to precisely quantify the fat concentrations. The advantages of these quantification methods include reduced labor, high accuracy with no additional scanning required, which makes it attractive to be applied in future clinical tests and lipid metabolism studies.

SSM10-04 Virtual Non-Contrast Images from Contrast-Enhanced Dual-Layer Spectral CT for Pediatric Abdominal CT: Are They Different from Adults?

Wednesday, Dec. 4 3:30PM - 3:40PM Room: E352

Participants
Minako Azuma, Miyazaki, Japan (*Presenter*) Nothing to Disclose
Toshinori Hirai, MD, PhD, Miyazaki, Japan (*Abstract Co-Author*) Research Grant, Bayer AG
Youhei Hattori, Miyazaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Zaw Aung Khant, Miyazaki, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroshi Nakada, MD, PhD, Miyazaki, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Virtual non-contrast (VNC) images from dual-layer spectral CT (DLSCT) might replace true unenhanced images for pediatric abdominal CT studies. We compared the accuracy of iodine subtraction in pediatric abdominal organs on VNC images obtained from contrast-enhanced DLSCT scans with that of true unenhanced (TU) images and assessed the difference between pediatric and adult patients.

METHOD AND MATERIALS

We included 10 child- (1-15 years, mean 8.7±4.4 year) and 40 adult patients (28-87 years, mean 56.4±17.6 year) who underwent unenhanced and contrast-enhanced DLSCT. Two radiologists assessed the image quality of all images on a 5-point scale. Venous-phase VNC images were generated and a region-of-interest (ROI) was placed on the liver, spleen, renal cortex, aorta, fat tissue, muscle and fiuid (gallbladder) on TU- and VNC images. The attenuation of each ROI in VNC image was subtracted from the corresponding attenuation of the TU image. The difference in attenuation between VNC- and TU images of children and adults was compared using the independent t-test and regression analysis.

RESULTS

In all 50 patients, there was no significant difference in the image quality of VNC- and TU scans (children: 4.8±0.4; adult: 4.5±0.5). The attenuation difference in the renal cortex between VNC- and TU images was significantly greater in adults than children (9.6±7.2 vs 1.2±8.2 HU, p=0.0046). The attenuation difference in the liver and spleen showed a similar tendency. With respect to fat tissue, attenuation was higher on VNC than TU images in almost all 50 patients. Scatter plots of the attenuatoin difference between VNC- and TU images versus the patient age showed a significant positive correlatoin only in the renal cortex (r=0.34, p=0.034).

CONCLUSION

VNC images derived from contrast-enhanced DLSCT showed iodine subtraction in abdominal organs more accurately on scans of children than adults.

CLINICAL RELEVANCE/APPLICATION

For the evaluation of abdominal contrast-enhanced CT scans, VNC imaging may be more useful in children than adults.

SSM10-05 Intra-individual Consistency of Spectral Detector CT-Enabled Iodine Quantification of the Intravascular and Renal Blood Pool

Wednesday, Dec. 4 3:40PM - 3:50PM Room: E352

Participants
Simon Lennartz, MD , Cologne, Germany (*Presenter*) Institutional Research Grant, Koninklijke Philips NV
Nuran Abdullayev, MD, Cologne, Germany (*Abstract Co-Author*) Nothing to Disclose
David Zopfs, MD, Cologne, Germany (*Abstract Co-Author*) Nothing to Disclose
David C. Maintz, MD, Koln, Germany (*Abstract Co-Author*) Nothing to Disclose
Stefan Haneder, MD, Cologne, Germany (*Abstract Co-Author*) Nothing to Disclose
Thorsten Persigehl, MD, Koeln, Germany (*Abstract Co-Author*) Nothing to Disclose
Nils Grosse Hokamp, MD, Koln, Germany (*Abstract Co-Author*) Speakers Bureau, Koninklijke Philips NV

For information about this presentation, contact:

Simon.Lennartz@uk-koeln.de

PURPOSE

Recent studies revealed high diagnostic accuracy of iodine maps from spectral detector CT (SDCT); however, little is known on reproducibility of iodine measurements in vivo which is crucial for oncologic follow-up imaging. Hence, the objective of this study was to analyze the intra-individual, longitudinal consistency in patients that underwent multiple SDCT examinations.

METHOD AND MATERIALS

79 patients with 2 (53 patients) or 3 (26 patients) clinically-indicated, biphasic (arterial/venous) abdominal SDCT scans were retrospectively identified for study inclusion. HU attenuation in conventional images and iodine concentration in iodine maps were measured by an experienced radiologist who placed circular regions of interest (ROI) in the following areas (two ROI each):

abdominal aorta, inferior caval vein, portal vein, renal cortices. To investigate intra-individual consistency of iodine and HU measurements, modified variation coefficients (MVC) were calculated.

RESULTS

Variability of HU attenuation and iodine concentration was significantly higher in arterial phase than in venous phase images (p <= 0.05). Regarding arterial phase attenuation measurements, median MVC was -1.8 (-20.5-21.3) % within the aorta and -6.5 (-44.0 - 48.7) % within the renal cortex while in the portal venous phase it was 0.62 (-11.1-11.7) % and -1.6 (-16.2-10.6) %, respectively. Regarding iodine quantification, MVC of arterial phase measurements was -2.5 (-22.9-28.4) % within the aorta and -5.8 (-55.9 - 29.6) % within the renal cortex. Referring MVCs of the portal venous phase were -0.7 (-17.9-16.9) % and -2.6 (-17.6-12.5) %.

CONCLUSION

Intra-individual iodine quantification of intravascular and renal blood pool is most consistent in venous-phase images (overall MVC: ±15 %) whereas arterial phase measurements are subject to greater variability.

CLINICAL RELEVANCE/APPLICATION

For clinical application of SDCT-derived iodine quantification, a certain variability of venous phase images should be considered while particular care must be taken when calculating iodine thresholds from arterial phase images, e.g. in oncologic follow-up.

SSM10-06 Conventional versus Virtual Monoenergetic Images from Spectral Detector CT: Evaluation of Attenuation and Noise

Wednesday, Dec. 4 3:50PM - 4:00PM Room: E352

Participants
Nils Grosse Hokamp, MD, Koln, Germany (*Presenter*) Speakers Bureau, Koninklijke Philips NV
Michelle K. Jordan, Beachwood, OH (*Abstract Co-Author*) Nothing to Disclose
Kai Roman Laukamp, MD, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose
Stefan Haneder, MD, Cologne, Germany (*Abstract Co-Author*) Nothing to Disclose
David C. Maintz, MD, Koln, Germany (*Abstract Co-Author*) Nothing to Disclose
Robert C. Gilkeson, MD, Cleveland, OH (*Abstract Co-Author*) Research Consultant, Riverain Technologies, LLC Research support, Koninklijke Philips NV Research support, Siemens AG Research support, General Electric Company
Amit Gupta, MBBS, Cleveland, OH (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

nils.grosse-hokamp@uk-koeln.de

PURPOSE

The utilization of VMI in daily practice is limited as attenuation (HU) is quite different and extensive re-windowing may be required. We aimed to identify the VMI energy that closest represents conventional images (CI) in order to demonstrate that these images demonstrate improved image quality in terms of noise and Signal-to-noise ratio (SD/SNR) while attenuation values remain unaltered as compared to CI.

METHOD AND MATERIALS

60 and 30 patients with contrast-enhanced (CE) and non-enhanced (NCE) SDCT of the abdomen were included in this retrospective, IRB-approved study. CI and VMI of 66, 68, 70, 72 and 74keV as well as quantitative iodine maps were reconstructed (Q-IodMap). Two regions of interest were placed in each: aorta, liver, pancreas, renal cortex and psoas muscle. For each reconstruction, attenuation and standard deviation were averaged. ΔHU and Signal-to-noise ratio was computed (SNR=HU/SD) were calculated. Q-IodMap were considered as confounder for ΔHU.

RESULTS

In NCE studies, no significant differences for any region was found. In CE studies, VMI72keV images showed lowest ΔHU (HUliverCI/VMI72keV: 104±18/103±17, p>=0.05). Iodine containing voxels as indicated by Q-IodMap resulted in over- and underestimation of attenuation in lower and higher VMI energies. Image noise was lower in VMI images (e.g. muscle: CI/ VMI72keV: 15.3±3.3 / 12.3±2.9 HU, p<=0.05). Hence, SNR was significantly higher in VMI72keV compared to CI (e.g. liver 3.8±0.6 vs 3.0±0.8, p<=0.05).

CONCLUSION

VMI72keV show improved SD/SNR characteristics while the attenuation remains unaltered as compared to CI. These images possibly may be used as replacement for conventional images.

CLINICAL RELEVANCE/APPLICATION

The noise reduction enabled by VMI72keV may allow for a reduction of radiation dose. The CI-equivalent attenuation values may increase their clinical acceptance.

SSM11

Gastrointestinal (CT Diagnosis)

Wednesday, Dec. 4 3:00PM - 4:00PM Room: E353A

CT GI

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

Participants
Perry J. Pickhardt, MD, Madison, WI (*Moderator*) Stockholder, SHINE Medical Technologies, Inc; Stockholder, Elucent Medical; Advisor, Bracco Group;
Andrea S. Kierans, MD, New York, NY (*Moderator*) Nothing to Disclose

Sub-Events

SSM11-01 The Role of Dynamic Contrast-Enhanced CT in Diagnosis and Management of Patients with Sustained Bleeding After Liver Transplantation

Wednesday, Dec. 4 3:00PM - 3:10PM Room: E353A

Participants
Jieun Byun, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Kyoung Won Kim, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ji Young Woo, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seongkeun Park, PhD, Asan , Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jae Hyun Kwon, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Gi Won Song, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sung Gyu Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the role of dynamic contrast-enhanced CT (DCE-CT) in the diagnosis and management of patients with sustained bleeding after liver transplantation (LT).

METHOD AND MATERIALS

Between November 2013 and December 2017, we retrospectively identified 270 patients (52.8±9.8 years; 18-76 years) who underwent DCE-CT after LT with clinically suspected postoperative bleeding. DCE-CT images were analyzed with emphasis on contrast media extravasation (CME): bleeding source, volume, rate, and morphologic pattern (type I, focal or stippled pattern; type II, jet-like pattern). Recipients were classified into two groups by primarily-chosen treatment method; nontherapeutic intervention (NTI) trial and primary therapeutic intervention (TI) groups. NTI trial group was further subdivided into NTI success and NTI failure groups according to results of NTI treatment. The differences of CME volume, rate, and pattern among the three groups and between the subgroups were evaluated. The concordances of bleeding source determined by DCE-CT to actual bleeding source were analyzed.

RESULTS

Of the 270 patients with clinically suspected postoperative bleeding, 134 CME sites were identified in 116 (43.0%) patients. While most (94.8%, 146/154) of patients without CME was successfully managed by NTI, the proportion decreased in the order particularly on portal venous phase with type I (48.5%, 16/33) and type II (16.9%, 14/83) CMEs. The mean CME volume on both arterial and portal venous phases and the mean CME rate significantly increased in order of NTI success, NTI failure, and primary TI groups ($p<0.01$, respectively). In subgroup analysis of NTI trial group, type II CME on portal venous phase was significantly higher in NTI failure group than in NTI success group (86.7% [13/15] versus 46.7% [14/30], $p=0.01$). There was substantial agreement in localization of bleeding source between DCE-CT and surgery or angiography (Cohen Kappa=0.78).

CONCLUSION

DCE-CT is helpful in the assessment for need of TI and to determine the treatment of choice in recipient with postoperative bleeding after LT.

CLINICAL RELEVANCE/APPLICATION

DCE-CT is helpful in the assessment for need of therapeuric intervention and in decision of treatment method in recipient with postoperative bleeding after LT.

SSM11-03 CT Evaluation of Bowel Perforation: Diagnostic Performance and Correlation of Imaging Features According to Sites and Causes

Wednesday, Dec. 4 3:20PM - 3:30PM Room: E353A

Participants
Keum-Nahn Jee, MD,PhD, Cheonan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yun Jin Lim, Cheonan, Korea, Republic Of (*Presenter*) Nothing to Disclose
Mi Hyun Park, Cheonan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jkn1303@yahoo.com

PURPOSE

To evaluate diagnostic accuracy of CT and correlation of imaging features of bowel perforation, according to sites and causes

METHOD AND MATERIALS

239 patients (M;F = 190:49, mean age 56.2) confirmed as bowel perforation were included. We analyzed initial CT scan with 3-D reformation, and evaluated about pneumoperitoneum, ascites, bowel discontinuity, mechanical or paralytic ileus, active bleeding, hemoperitoneum, and localized peritoneal change like fecaloma, etc. according to sites and causes, by consensus of two abdominal radiologists, and reviewed medical record. Exclusion criteris were previous abdominal surgery or peritonitis or peritoneal carcinomatosis, liver cirrhosis, peritoneal dialysis, and more than 48 hours between CT scan and surgery.

RESULTS

97 patients were traumatic (gastro-duodenum [n=8], jejunum/ileum [n=67], colon/rectum [n=22]) and 142 non-traumatic (gastro-duodenum [n=126], jejunum/ileum [n=8], colon/rectum [n=8]) causes. Overall CT accuracy was 84.1%; higher in traumatic and non-traumatic gastro-duodenum (100% and 96.8%) and non-traumatic colon/rectum (100%), and lowest in traumatic perforation of jejunum/ileum (61.5%). CT analysis results with statistical significant difference (p<.05) were as follows; pneumoperitoneum in gastro-duodenum and colon/rectum more than non-traumatic jejunum/ileum, ileus in traumatic gastro-duodenum and jejunum/ileum more than the others, bowel discontinuity in traumatic cuase more than non-traumatic, localized peritoneal change in traumatic gastro-duodenum and non-traumatic causes, regional lymphadenopathy in non-traumatic colon/rectum, active bleeding or hemoperitoneum only in traumatic causes, and increased morbidity and mortality in older age regardless of sites or causes.

CONCLUSION

Diagnostic accuracy is good, highest in gastro-duodenal and non-traumatic colo-rectal perforation, and lowest in traumatic perforation of jejunum and ileum. Traumatic perforation of jejunum and ileum shows low diagnostic accuracy due to lower frequency of bowel discontinuity, pneumoperitoneum, and localized peritoneal change. Bowel discontinuity is more frequent in traumatic cause. Localized peritonel abnormality is more frequent in non-traumatic cause.

CLINICAL RELEVANCE/APPLICATION

CT with 3-dimentional reformation could show good diagnostic performance for bowel perforation and various imaging features according to sites and causes of perforation.

SSM11-04 Relative Sarcopenia with Excess Adiposity is an Independent Predictor of Survival After Transjugular Intrahepatic Portosystemic Shunt (TIPS) Creation

Wednesday, Dec. 4 3:30PM - 3:40PM Room: E353A

Participants
Islam H. Zaki, MBBCh, Durham, NC (*Presenter*) Nothing to Disclose
Erol Bozdogan, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Matthew K. Langman, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Matthew Kappus, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Steven S. Choi, MBBS, Durham , NC (*Abstract Co-Author*) Nothing to Disclose
Jonathan Martin, MD, Durham, NC (*Abstract Co-Author*) Advisory Board, Dova Pharmaceuticals
Paul V. Suhocki, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Tony P. Smith, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Charles Y. Kim, MD, Raleigh, NC (*Abstract Co-Author*) Consultant, Medtronic plc; Consultant, Humacyte; Consultant, Galvani
Mustafa R. Bashir, MD, Cary, NC (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, NGM Biopharmaceuticals, Inc; Research Grant, Madrigal Pharmaceuticals, Inc; Research Grant, Metacrine, Inc; Research Grant, Pinnacle Clinical Research; Research Grant, ProSciento Inc; Research Grant, Carmot Therapeutics; Research Grant, 1Globe Health Institute; Research Consultant, ICON plc;
James S. Ronald, MD, PhD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Islam.Zaki@duke.edu

PURPOSE

To assess whether relative sarcopenia with excess adiposity is a risk factor for poor survival after TIPS.

METHOD AND MATERIALS

This single institution retrospective study included patients over 18 years of age who underwent TIPS creation and had abdominal CT scans performed within 100 days prior to or 30 days after TIPS. Subcutaneous fat, visceral fat and abdominal wall muscles were segmented at the inferior L3 endplate. Relative sarcopenia with excess adiposity was defined as the lowest gender specific quartile of muscle area divided by muscle plus fat area. Dates of death, liver transplantation, spontaneous occlusion or embolization of the TIPS, and post-TIPS hepatic encephalopathy (HE) were identified. Mortality was analyzed using competing risks survival analysis, and post-TIPS HE was analyzed using negative binomial regression and competing risks survival analysis

RESULTS

The cohort included 141 patients (mean age 56 years ±11, 91 men) who underwent CT an average of 17 days before TIPS (range 97 days prior to 26 days after). In univariate survival analyses, Model for End Stage Liver Disease (MELD) score (hazard ratio [HR]=1.09 per 1-point increase in MELD, 95% confidence interval [CI]=1.05-1.13, p<0.001) and relative sarcopenia with excess adiposity (HR=2.7, CI=1.55-4.69, p<0.001) were significant risk factors for shorter survival after TIPS. In a multivariate analysis both MELD score (HR=1.11, CI=1.06-1.16, p<0.001) and relative sarcopenia with excess adiposity (HR=2.46, CI=1.42-4.26, p=0.001) were significant predictors of survival. The C-index at 30 days was 0.71 for MELD, 0.72 for relative sarcopenia with excess adiposity, and 0.8 for a model including both. There was no association between relative sarcopenia with excess adiposity

and number of post-TIPS HE episodes (incidence rate ratio=1.08, CI=0.49-2.40, p=0.84) or time to first post-TIPS HE episode (HR=0.89, CI=0.51-1.54, p=0.67)

CONCLUSION

Relative sarcopenia with excess adiposity, defined as the lowest quartile of gender specific muscle area normalized to muscle plus fat measured by CT, is an independent risk factor for poor survival after TIPS and may supplement MELD score

CLINICAL RELEVANCE/APPLICATION

A deficiency in abdominal muscle mass relative to fat as assessed by CT is associated with poor survival after TIPS. This anthropometric index may improve the ability to predict outcomes in cirrhotic patients undergoing TIPS

SSM11-05 Value of Computed Tomography Finding in Evaluating the Acute Cellular Rejection of the Pancreas Allograft

Wednesday, Dec. 4 3:40PM - 3:50PM Room: E353A

Participants
Jeong A Yeom, Yangsan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hwaseong Ryu, Yangsan, Korea, Republic Of (*Presenter*) Nothing to Disclose
Tae Un Kim, MD, Yangsan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jun Woo Lee, MD, Pusan, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate computed tomography (CT) findings in patients with or without acute cellular rejection (ACR) after pancreas transplantation

METHOD AND MATERIALS

Twenty-two pancreas allograft recipients (pancreas transplantation alone: 17, pancreas transplantation after kidney transplantation: 3, pancreas transplantation after liver transplantation: 1, simultaneous pancreas and kidney transplantation: 1) that underwent at least one follow-up CT examination were included in this study. Among them, 8 patients were diagnosed as ACR by percutaneous biopsy within 3 day from CT examination. Two radiologists analyzed pre-biopsy CT images of patients with ACR and the latest CT images of patients without ACR compared with early follow-up CT for graft swelling, perivascular soft tissue infiltration of graft arteries, change from acute to obtuse angle between graft SMV and splenic vein, graft enhancement on the delayed phase, fat strands or fluid around graft, and graft duodenal wall thickening. Intra-class correlation (ICC) was used to analyze inter-observer agreement of CT findings.

RESULTS

Mean interval between transplantation and CT examination was not significantly different between patients with ACR and patients without ACR (467.5±261.9 days vs 508.2±343.3 days, p = 0.838). Three patients with grade 1, and five patients with grade 2 ACR were noted by pathological analysis. Change from acute to obtuse angle between graft SMV and splenic vein (p = 0.001) and graft duodenal wall thickening (p < 0.001) were observed more frequently in patients with ACR. Other CT findings did not show significant difference between ACR and non-ACR group (p = 0.060-1.000). Inter-observer agreement for angle between graft SMV and splenic vein (ICC: 0.896), graft duodenal wall thickening (ICC: 0.945) were excellent, and fair to excellent agreements were noted for other CT findings (ICC: 0.456 - 1.000).

CONCLUSION

CT examination can be helpful to predict ACR in patients after pancreas transplantation using change of angle between graft SMV and splenic vein with excellent inter-observer agreement.

CLINICAL RELEVANCE/APPLICATION

CT findings including change of angle between graft SMV and splenic vein might be helpful for prediction of ACR as well as evaluation of postoperative complications in patients after pancreas transplantation.

SSM11-06 Diagnostic Accuracy of Multidetector CT in Detecting Juxta-Ampullary Duodenal Diverticulum in Symptomatic Patients

Wednesday, Dec. 4 3:50PM - 4:00PM Room: E353A

Participants
Daniel Fadaei Fouladi, MD, Baltimore, MD (*Presenter*) Nothing to Disclose
Elham Eghbali, Tabriz , Iran (*Abstract Co-Author*) Nothing to Disclose
Masoud Shirmohammadi, Tabriz , Iran (*Abstract Co-Author*) Nothing to Disclose
Shadi Daghighi, San Diego , CA (*Abstract Co-Author*) Nothing to Disclose
Shahab Shayesteh, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Saeed Ghandili, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Reza Javadrashid, MD, Tabriz, Iran (islamic Rep. Of) (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To determine the diagnostic accuracy of 64-slice multidetector computed tomography (MDCT) in detecting juxta-ampullary duodenal diverticulum (JADD) in symptomatic patients.

METHOD AND MATERIALS

After being approved by the Ethics Committee of our university, a total of 100 patients with endoscopic retrograde cholangiopancreatography (ERCP)-confirmed JADD and 20 patients with extrahepatic biliary obstruction due to other reasons were enrolled in this study. All patients were evaluated by MDCT, as well. Without knowing the result of ERCP, two experienced radiologists reviewed MDCT images and accordingly, the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of MDCT in detecting JADD, as the etiology of obstruction, were calculated.

RESULTS

The study group comprised 60 males and 60 females with the mean age of 68.83±12.71 years (range, 27-93) at the time of evaluation. The sensitivity, specificity, PPV and NPV of MDCT in detecting JADD were 76% (95% confidence interval, CI; 66%-84%), 100%, 100% and 45.5% (95%CI; 30%-61%), respectively. The only independent reason for missing a JADD on MDCT images was its small size (<10mm).

CONCLUSION

Abdominal MDCT is highly specific in detecting JADD as the underlying cause of obstruction in symptomatic patients. The accuracy increases when the diverticulum is larger than 10mm.

CLINICAL RELEVANCE/APPLICATION

64-slice MDCT is highly accurate in ruling in juxta-ampullary duodenal diverticula as the underlying cause of extrahepatic biliary obstruction.

Printed on: 10/29/20

SSM26

Vascular/Interventional (Liver Cancer Basic Science)

Wednesday, Dec. 4 3:00PM - 4:00PM Room: S403A

GI IR VA

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

FDA Discussions may include off-label uses.

Participants
Nadine Abi-Jaoudeh, MD, Orange, CA (*Moderator*) Research collaboration, Koninklijke Philips NV; Research collaboration, Teclison Cherry Pharma Inc; Research support, SillaJen, Inc; Intellectual property and Owner, Bruin Biosciences Inc
D. T. Johnson, MD,PhD, South San Francisco, CA (*Moderator*) Inventor, Thunar Medical, Inc

Sub-Events

SSM26-01 Comparison Between HSV-TK Gene Therapy and Oncolytic Virotherapy for Radiofrequency Hyperthermia-Enhanced Treatment of Orthotopic Hepatic Cancer

Wednesday, Dec. 4 3:00PM - 3:10PM Room: S403A

Awards
Trainee Research Prize - Fellow

Participants
Shanshan Gao, Seattle, WA (*Presenter*) Nothing to Disclose
Jingjing Song Jr, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Xiaolin Wang, MD, Shanghai, China (*Abstract Co-Author*) Nothing to Disclose
Fu Xiong, PhD, MD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Spencer M. Cheng, Woodinville, WA (*Abstract Co-Author*) Nothing to Disclose
Feng Zhang, MD, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Xiaoming Yang, MD, PhD, Mercer Island, WA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

17111320002@fudan.edu.cn

PURPOSE

To compare the efficacies between intratumoral herpes simplex virus-thymidine kinase (HSV-TK)/ganciclovir (GCV) gene therapy and oncolytic virotherapy for image-guided radiofrequency hyperthermia (RFH)-enhanced treatment of orthotopic liver cancer.

METHOD AND MATERIALS

Luciferase-labeled rat hepatocellular carcinoma (HCC) cells and 36 rats with orthotopic HCCs were treated in 6 groups: (1) combination therapy with oncolytic viruses (T-VEC) plus RFH; (2) T-VEC alone; (3) HSV-TK/GCV gene therapy plus RFH; (4) gene therapy alone; (5) RFH alone; and (6) saline. For in-vitro experiments, confocal microscopy, MTS assay and bioluminescence optical imaging were used to evaluate cell viabilities and proliferation. For in-vivo validation, HSV-TK or T-VEC were directly infused into HCC masses through a multi-modal perfusion-thermal RF electrode under imaging guidance, followed by RFH at 42 °C for 30 minutes. For gene therapy groups, GCV was intraperitonially administrated daily for 14 days. Optical imaging and ultrasound imaging were used to follow up bioluminescence signal and size changes of tumors, followed by pathology confirmation.

RESULTS

Confocal microscopy showed the significant decreases of cell viabilities and bioluminescence signal intensities in the combination therapy of HSV-TK with RFH or T-VEC with RFH, compared to other monotherapy groups (n=6/group, P <.05). Ultrasound and optical imaging showed that both combination therapies of HSV-TK or T-VEC with RFH caused decreases of average tumor volume and bioluminescence signal intensity, compared to groups with monotherapy (n=6/group, P <.05). However, no statistically significant differences were found between the two combination therapy groups. Pathology examination with apoptosis analysis further confirmed these imaging findings.

CONCLUSION

Both intratumoral HSV-TK/GCV gene therapy and oncolytic virotherapy combined with RFH have the synergistic therapeutic effect on hepatic cancers, but no efficacy difference was found between these two combination therapies, which indicates RFH-enhanced oncolytic virotherapy is favorable for managing hepatic cancers, since the oncolytic virus, T-VEC, has been approved by FDA for human cancer treatment.

CLINICAL RELEVANCE/APPLICATION

RFH-enhanced oncolytic virotherapy is favarable for hepatic cancers, since the oncolytic virus, T-VEC, has been approved by FDA for human cancer treatment.

SSM26-02 Yttrium-90 Radioembolization as a New Treatment for Brain Cancer: Proof of Concept in a Canine Spontaneous Brain Tumor Model

Wednesday, Dec. 4 3:10PM - 3:20PM Room: S403A

Participants
Alexander S. Pasciak, PHD, Laurel, MD (*Presenter*) Research Grant, BTG International Ltd
Sasicha Manupipatpong, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Ferdinand K. Hui, MD, Richmond, VA (*Abstract Co-Author*) Speakers Bureau, Terumo Corporation Speakers Bureau, Penumbra, Inc Stockholder, Blockade Medical Inc
Rebecca Krimins, DVM,MS, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose
Larry Gainsburg, Baltimore , MD (*Abstract Co-Author*) Nothing to Disclose
Matthew R. Dreher, PhD, Rockville, MD (*Abstract Co-Author*) Technical Director, Biocompatibles International plc
Dara L. Kraitchman, DVM, PhD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Galil Medical
Clifford R. Weiss, MD, Baltimore, MD (*Abstract Co-Author*) Research Grant, Siemens AG Research Grant, Merit Medical Systems, Inc Research Grant, BTG International Ltd Medical Advisory Board, Clear Guide Medical LLC Founder, Avasys, LLC Officer, Avasys, LLC

For information about this presentation, contact:

Alexander.pasciak@icloud.com

PURPOSE

To evaluate Yttrum-90 (Y90) radioembolization (RE) as a minimally invasive treatment for brain cancer in a canine model.

METHOD AND MATERIALS

Three healthy research dogs (R1-R3) and two patient dogs with spontaneous intra-axial brain tumors (T1-T2) underwent transarterial RE with Y90 glass microspheres. Both tumors enhanced on pre-treatment MRI and were compatible with high-grade glioma. Y90RE was performed on research dogs from unilateral MCA, PCA or ICA while both dogs with tumors were treated from the ICA. Post-treatment Y90 PET/CT was performed along with serial, weekly neurological exam by a veterinary neurologist. One month after treatment, a post-treatment MRI was obtained on all animals.

RESULTS

Average absorbed-dose for dogs R1-R3 calculated from Y90 PET/CT were: 20.2±2.8 Gy to the whole treated hemisphere, 52.5±23.5 Gy to the perfused tissue region and doses to the basal ganglia/thalamus ranging from 10.2-67.2 Gy depending on the treated territory. Dog T1 received 8.4 Gy to uninvolved brain and 35.0 Gy to tumor, while dog T2 received 13.2 Gy to uninvolved brain and 115.2 Gy to tumor. Transient changes in neurological exam lasting between 1-3 weeks before resolution were found in dogs R1, R2 and T1 and included unilateral delayed proprioception, postural reaction, decreased facial sensation and vision. Post-treatment MRI on dogs R1-R3 demonstrated absence of cortical atrophy or microinfarction. At 1-month post-therapy, MRI of dog T1 showed an 83% reduction in tumor volume, resolution of perilesional edema and falx shift as well as absence of contrast enhancement. Dog T2 demonstrated a 59% reduction in tumor volume also with resolution of falx shift and perilesional edema. Cortical atrophy was not appreciated in either tumor bearing animal. T1 and T2 are currently clinically asymptomatic with an unremarkable neurologic exam and are scheduled for repeat MRI imaging at 3 months post-therapy.

CONCLUSION

Y90RE is technically feasible in a canine model. Critical normal brain structures tolerated up to 67.2Gy with complete resolution of symptoms. A favorable dosimetric distribution with increased uptake in tumor is possible even with hemispheric (ICA) treatment. Initial clinical outcomes are positive, however, additional data on safety and efficacy is required.

CLINICAL RELEVANCE/APPLICATION

Y90 radioembolization has shown initial promise in the treatment of spontaneous brain tumors in a canine model.

SSM26-03 Prognostic Significance of Pretreatment Inflammatory Markers in Uveal Melanoma Liver Metastases Undergoing Hepatic Chemoperfusion

Wednesday, Dec. 4 3:20PM - 3:30PM Room: S403A

Participants
Johannes M. Ludwig, MD, Dusseldorf, Germany (*Presenter*) Nothing to Disclose
Nicola Spieker, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Axel Wetter, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Benedikt M. Schaarschmidt, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Johannes Haubold, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Michael Forsting, MD, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Jens M. Theysohn, MD, Essen, Germany (*Abstract Co-Author*) Consultant, BTG International Ltd
Yan Li, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Ophelia 4. Drescher, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose
Heike Richly, Essen, Germany (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Johannes-maximilian.ludwig@uk-essen.de

PURPOSE

To evaluate inflammatory markers (CRP, neutrophil to lymphocyte ratio (NLR), platelet to lymphocyte ratio (PLR) and systemic inflammatory index (SII)) as a pretreatment prognostic factors in patients with unresectable uveal melanoma liver metastases undergoing a structured transarterial hepatic chemoperfusion (THC) protocol.

METHOD AND MATERIALS

56 patients (median age: 61 years, 44% male) were retrospectively assessed. A median of 3 (range: 1-11) THC sessions were performed with melphalan replaced by Fotemustin when progressing. Inflammatory markers were calculated as follows: SII: (platelets/nl × neutrophils/nl)/ (lymphocytes/nl), PLR: (platelets/nl)/(lymphocytes/nl), NLR: (neutrophils/nl)/(lymphocytes/nl).

Kaplan-Meier for median overall survival in months (OS;95%CI) and Cox Proportional Hazard Model for uni- (UVA) & multivariate (MVA) analyses (Hazard ratio;95%CI) were performed.

RESULTS

Median OS of the study cohort was 7.7 (6.3-10.9) months. Overall survival was prolonged for lower values of CRP (non-elevated: 13.5; 7.2-20,6 vs. elevated: 5.2; 3.9-7.7; p=.0003), PLR (<150: 15.8; 6.4-. versus >150: 7; 4.7-8.2, p=.003), SII (<1000: 11; 7.2-20.6 versus >1000: 5.6; 3.9-7.8, p=.0005) and NLR (<3.5: 11.1; 7,1-20.6, vs.>3.5: 6.3; 3.5-7.8, p=.004). MVA confirmed non-elevated CRP (0.37; 0.17-0.78; p=.008) and PLR <150 (0.39; 0.13-0.95p=.038) as independent predictors for longer overall survival. Combining significant values from in MVA improves survival prediction: Patients with non-elevated CRP and low PLR survived the longest (median not reached) vs. patients with either CRP or PLR elevation (11,1; 7-13.5) vs. elevated CRP and PLR (4.8; 3.4-7.5), p<.0001. Difference between each group was statistically significant in UVA.

CONCLUSION

Pretreatment inflammatory markers (CRP, NLR, PLR, SII) play a prognostic role in patient survival with uveal melanoma liver metastases treated with THC. Utilizing pretreatment CRP and PLR as independent predictors may help to identify patients potentially profiting from therapy.

CLINICAL RELEVANCE/APPLICATION

Inflammatory markers play a pivotal role in predicting overall survival and may provide information on treatment effectiveness and to estimatie life expectancy. This can help informed clinical treatment decision making and is of great value for patients and their relatives to set expectations regarding transarterial hepatic chemoperfusion as treatment option for patients with uveal melanoma liver metastases.

SSM26-04 Comparison of Parallel and Crossed Placement of Multiple Radiofrequency Electrode in the Treatment of Liver Tumor: An Animal Experiment

Wednesday, Dec. 4 3:30PM - 3:40PM Room: S403A

Participants
Kun Zhao, Beijing , China (*Abstract Co-Author*) Nothing to Disclose
An-Na Jiang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Wei Yang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Song Wang, Beijing, China (*Presenter*) Nothing to Disclose
Zhong-Yi Zhang, PhD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Kun Yan, BS, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

The purpose of this study was to investigate the effect of parallel and crossed needle placement with radiofrequency ablation in liver.

METHOD AND MATERIALS

The experiment was performed in ex vivo bovine liver with the radiofrequency generator (Celon) and two electrode needles (200T30). Parallel and crossed needle placements were designed in our experiment. The electrode needles were placed in the shape of '=' in the parallel group and in the shape of 'x' in the crossed group. The ablation zones were compared when the shortest distances of the electrodes (2cm, 2.5cm, 3cm) or the output powers (20W, 25W, 30W) were different.(n=6 for each group). At 2 hours after ablation, the gross pathological specimens were stained with TTC. The long-axis diameter and the short-axis diameter were measured and the coagulation area of ablation zones were compared.

RESULTS

When 25W power was applied and the shortest distances of the electrodes were 2cm, 2.5cm and 3cm, the ablation zones in the two groups were quasi-circular and increased with distance. When the shortest distances were fixed, there was no significant difference in the coagulation area between the two groups (2cm: 4.6x3.7cm vs. 4.8x3.9cm, P=0.369; 2.5cm: 4.8x4.3cm vs.5.0x4.5cm, P=0.661; 3cm: 5.0x4.5cm vs. 5.3x4.6cm, P= 0.339). When the shortest distance was 3.5cm, the coagulation zone could not be fused and was lobulate-shaped. When the shortest distance was 2.5cm and the outputs were 25W and 30W, the coagulation areas were quasi-circular and did not increase with higher power. There was no significant difference. (25W: 4.8x4.3cm vs. 5.0x4.5cm, P=0.452; 30W: 5.1x4.5cm vs. 5.1x4.7cm, P= 0.894). When the output was 20W, the coagulation zone could not be fused in parallel group, while an effective coagulation area was produced in the crossed group (4.4x3.9cm).

CONCLUSION

The traditional opinion is that the crossed placement of electrodes was limited in coagulation area. Our study showed that the ablation zone of the two groups were similar when the shortest distance was the same and the maximum distance no more than 3cm. When the output was reduced, the fusion effect of coagulation area in crossed group was better than that in parallel group. These data provided helpful information for the design of needle placement in radiofrequency ablation of liver tumors.

CLINICAL RELEVANCE/APPLICATION

Radiofrequency ablation is one of the most widely used techniques in tumor ablation.

SSM26-05 A Novel Approach to Liver-Directed Therapy for Metastatic Well-Differentiated Neuroendocrine Tumor: Efficacy of Concurrent Everolimus with Hepatic Transarterial Bland Embolization (EveroEmbo)

Wednesday, Dec. 4 3:40PM - 3:50PM Room: S403A

Participants
Riham H. El Khouli, MD,PhD, Nicholasville, KY (*Abstract Co-Author*) Nothing to Disclose
Gaby E. Gabriel, MD, Lexington, KY (*Presenter*) Nothing to Disclose
Harit Kapoor, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Ahmed H. Ragab, MBBCh, Alexandria , Egypt (*Abstract Co-Author*) Nothing to Disclose

M. Elizabeth Oates, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Aman Chauhan, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Lowell B. Anthony, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Liver-directed embolizarion have been the mainstay for locoregional metastatic tumor control. There continues to be considerable controversy around the optimal protocol. Recent studies suggested long-term hepatotoxicity of transarterial radioembolization (TARE). RADIANT-3 and -4 reported Everolimus resulting in median progression-free survival (PFS) of 11 months, while TAE resulted in median hepatic PFS (hPFS) of 15 months. TAE induces ischemic cell injury, yet ischemia- induced activation of vascular endothelial growth factor (VEGF) leads to neovascularization, a known cause of resistance. Everolimus is an mTOR kinase inhibitor shown to inhibit the response of vascular endothelial cells to stimulation by VEGF. Everolimus is typically held 2-4 weeks before and after embolization to minimize toxicity. We hypothesize that the concurrent use of Everolimus with TAE (EveroEmbo) would result in prolonged local liver tumor control compared to either therapy alone.

METHOD AND MATERIALS

Review of all consecutive patients who underwent EveroEmbo between 9/2016 and 12/2018 at the ----------. Inclusion criteria included systemic Everolimus for >= 1 month before embolization. For median hPFS analysis, only patients with > 12 months post-TAE imaging were included. An independent radiologist reviewed all baseline and subsequent post-therapy imaging and assessed liver-specific treatment response according to RECIST 1.1 criteria

RESULTS

63 EveroEmbo procedures in 38 consecutive patients were performed. 58% (22/38) were females while 42% (16/38) were males, with mean age of 57.8 $\pm$ 12.8 years. Only 40 procedures had sufficient post-procedural imaging to apply RECIST 1.1. Imaging showed 82.5% with partial response and 17.5% with stable disease; no patient had disease progression. The percentage change in liver tumor burden was -46.3% + 18.3%. Among the 63 EveroEmbo procedures, 21 had > 12 months follow-up imaging; no patients progressed to date and their median hPFS was 17 months.

CONCLUSION

Concurrent EveroEmbo is a promising approach for local hepatic disease control with a median hPFS of 17 months. Longer follow-up is needed to assess the true median hPFS in metastatic well-differentiated NETs.

CLINICAL RELEVANCE/APPLICATION

Concurrent EveroEmbo resulted in partial response in 82.5% of patients with a mean of 46% reduction in tumor burden and 17 months median hPFS. To date, none of our patients have evidence of disease progression

SSM26-06 The Inhibiting Effect of All-Trans Retinoic Acid on Liver Cancer Stem-Like Cells after Insufficient RF Ablation

Wednesday, Dec. 4 3:50PM - 4:00PM Room: S403A

Participants
Song Wang, Beijing, China (*Presenter*) Nothing to Disclose
Jing-tao Liu, Beijing , China (*Abstract Co-Author*) Nothing to Disclose
Hao Wu, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Wei Yang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Hai-bo Han, PhD, Beijing , China (*Abstract Co-Author*) Nothing to Disclose
An-Na Jiang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Xiu-mei Bai, MD, Beijing , China (*Abstract Co-Author*) Nothing to Disclose
Kun Yan, BS, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yan-hua Zhang, Beijing , China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

worsonwang@163.com

PURPOSE

To investigate the role of tumor stem-like cells (TSCs) in recurrent HCC after insufficient RFA and the effect of combination treatment with all-trans retinoic acid (ATRA) in human HCC models.

METHOD AND MATERIALS

Methods: First, the self-renew ability of HepG2 cells was assessed in vitro at 37°C or 42°C. Second, mice bearing HepG2 liver adenocarcinomas were randomized into two groups: (a) no treatment, (b) treatment with insufficient RFA. Tumor size were monitored every 2 days and mice was sacrificed when the tumor was 2cm in diameter. Flow cytometry was used to analyze the percentage of CD133+ and CD326+ cells from the tissue samples of the two groups. Third, HepG2 mice were randomized into four groups: (a) RFA followed by IP ATRA (10mg/kg), (b) RFA followed by IP ATRA (20mg/kg), (c) RFA followed by IP ATRA (40mg/kg), (d) RFA alone. The tumor sizes at day 20 were compared among different groups by analysis of variance. Additionally, pathological staining, western blot and flow cytometry were used for analysing the TSCs and tumor apoptosis. Fourth, the subsequently transplanted formation rate of TSCs was evaluated.

RESULTS

First, in vitro, HepG2 cells which incubated at 42°C water bath displayed significantly higher sphere-forming efficiency compared with the cells incubated at 37°C (43±6% vs 8.7±3%, p<0.01). In vivo, the HepG2 tumor model after insufficient ablation grew up faster compare with no treatment group(p=0.021), and the percentage of CD133+ cells (39.3%) and CD326+ cells (42.7%) was higher than no treatment group (17.1%, 18.4%). The combination of ATRA and RFA decreased the tumor sizes at day 20 with different doses (0mg/kg: 774.2±158.6mm3 vs 10mg/kg: 369.7±106.5mm3 vs 20mg/kg: 152.8±113.7mm3 vs 40mg/kg:143.3±94.8mm3, Overall P<0.001). The combination of RFA and ATRA had the best survival outcome compare with RFA group. In addition, the combined treatment with ATRA showed less TSCs and more intensive cell apoptosis compared to RFA alone. The transplanted formation rate of TSCs after combination treatment was lower than no treatment group(P<0.001).

CONCLUSION

TSCs might had close relationship to the recurrent HCC after RFA. ATRA could significantly improve the effect of RFA, partially attributed to ATRA effectively induced differentiation of TSCs.

CLINICAL RELEVANCE/APPLICATION

Combining with ATRA could enhance the effects of RFA and reduce a part of promention of recurrent HCC involved in the TSCs after insufficient RFA.

Printed on: 10/29/20

SPSC42

Controversy Session: Hepatocellular Carcinoma: Should We Use CT, MR, or US?

Wednesday, Dec. 4 4:30PM - 6:00PM Room: N227B

CT GI MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Claude B. Sirlin, MD, San Diego, CA (*Moderator*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc
R. Brooke Jeffrey Jr, MD, Stanford, CA (*Moderator*) Nothing to Disclose

LEARNING OBJECTIVES

1) To understand the need for screening and surveillance for HCC in cirrhosis. 2) To understand that ultrasound is currently recommended as the primary modality for this purpose by all national and international guidelines. 3) To understand the advantages and disadvantages of ultrasound, CT, and MRI for HCC screening and surveillance in cirrhosis.

Sub-Events

SPSC42A Overview of HCC Screening and Surveillance: Definitions, Rationale, Basic Concepts, Current Guidelines, USA Landscape, Worldwide Landscape

Participants
Aya Kamaya, MD, Stanford, CA (*Presenter*) Royalties, Reed Elsevier; Researcher, Koninklijke Philips NV; Researcher, Siemens AG

SPSC42B Why Ultrasound Should Be Used for HCC Screening/Surveillance

Participants
Shuchi K. Rodgers, MD, Philadelphia, PA (*Presenter*) Nothing to Disclose

SPSC42C Why CT Should Be Used for HCC Screening/Surveillance

Participants
Avinash R. Kambadakone, MD, Boston, MA (*Presenter*) Research Grant, General Electric Company; Research Grant, Koninklijke Philips NV

For information about this presentation, contact:

akambadakone@mgh.harvard.edu

LEARNING OBJECTIVES

1) Understand the role of CT in the diagnosis of HCC. 2) Learn the limitations of CT in HCC screening including radiation dose and strategies to diminish the risk. 3) Review innovations in CT and its impact on screening of HCC.

SPSC42D Why MRI Should Be Used for HCC Screening/Surveillance

Participants
Takeshi Yokoo, MD, PhD, Dallas, TX (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Takeshi.Yokoo@UTSouthwestern.EDU

ED005-TH

Gastrointestinal Thursday Case of the Day

Thursday, Dec. 5 7:00AM - 11:59PM Room: Case of Day, Learning Center

AMA PRA Category 1 Credit ™: .50

Participants

Anup S. Shetty, MD, Saint Louis, MO (*Presenter*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier
Cameron Adler, MD, Phoenix, AZ (*Abstract Co-Author*) Nothing to Disclose
Stephanie T. Chang, MD, Palo Alto, CA (*Abstract Co-Author*) Nothing to Disclose
Amy K. Hara, MD, Scottsdale, AZ (*Abstract Co-Author*) Nothing to Disclose
Maria Zulfiqar, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Joseph R. Grajo, MD, Gainesville, FL (*Abstract Co-Author*) Nothing to Disclose
Laura L. Magnelli, MD, Gainesville, FL (*Abstract Co-Author*) Nothing to Disclose
Joseph W. Owen, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Michael Nisiewicz, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Andres R. Ayoob, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
James T. Lee, MD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Rex A. Parker III, MD, Saint Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Emilie T. Nguyen, MD, Playa Vista, CA (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Each GI case of the day will be taken from disorders of the luminal GI tract as well as the liver, spleen, pancreas, and biliary system. The findings may be uncommon manifestations of common diseases or common manifestations of uncommon diseases.

SPDL50

Keeping Radiology Weird: Spot Diagnoses from the Pacific Northwest (Case-based Competition)

Thursday, Dec. 5 7:15AM - 8:15AM Room: E451B

GI MI MK NM

AMA PRA Category 1 Credit ™: 1.00
ARRT Category A+ Credit: 0

Participants
Barry G. Hansford, MD, Chicago, IL (*Presenter*) Nothing to Disclose
Elena K. Korngold, MD, Portland, OR (*Presenter*) Nothing to Disclose
Nadine Mallak, MD, Portland, OR (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Hansford@ohsu.edu

korngold@ohsu.edu

mallak@ohsu.edu

Special Information

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

LEARNING OBJECTIVES

1) Be introduced to a series of musculoskeletal, abdominal radiology and nuclear medicine case studies via an interactive game approach designed to encourage "active" consumption of education material. 2) 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) Receive a personalized self-assessment report via email that will review the case material presented during the session, along with individual and team performance.

RC608

Emergency Radiology Series: Contemporary Topics in Imaging of Trauma

Thursday, Dec. 5 8:30AM - 12:00PM Room: S401CD

CT ER GI

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

Participants
Ferco H. Berger, MD, Toronto, ON (*Moderator*) Speaker, Siemens AG
Michael N. Patlas, MD,FRCPC, Hamilton, ON (*Moderator*) Speaker, Springer Nature
Felipe Munera, MD, Key Biscayne, FL (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

patlas@hhsc.ca

fmunera@med.miami.edu

fhberger@gmail.com

Sub-Events

RC608-01 Whole Body CT of Trauma

Thursday, Dec. 5 8:30AM - 9:00AM Room: S401CD

Participants
Ferco H. Berger, MD, Toronto, ON (*Presenter*) Speaker, Siemens AG

For information about this presentation, contact:

fhberger@gmail.com

LEARNING OBJECTIVES

1) To be familiar with currently worldwide accepted protocols in polytrauma CT imaging. 2) To know clinical conditions requiring whole-body CT. 3) To comprehend the selection of trauma patients for targeted CT examinations.

ABSTRACT

In the western world, polytrauma is the major cause of mortality in people under 45 years of age. Furthermore, it is a major contributor to loss of quality of life and ability to work. The setting of polytrauma is almost always chaotic, not a favourable environment to come to timely diagnosis and treatment. To decrease morbidity and mortality, time is everything. It is our job as radiologist to contribute to the trauma team and help facilitate timely diagnosis - and in many cases, also timely treatment by interventional radiology. To reach the best treatment strategy for the patient as quickly and accurately as safely possible, is the goal. In this update on imaging of polytrauma patients, the focus is on the role of CT to achieve this goal. With the progress in CT scanner development, different protocol options arise. Which CT protocols are being used and what factors do they depend upon? In addition, there is a widespread increase in use of whole body CT internationally, is this a good thing or should we be more selective? What is the current evidence to select patients for targeted CT examinations in polytrauma? A lot of these questions have not been definitively resolved. This lecture aims to provide an update of the current insights into the use of CT for trauma care, with the goal to choose wisely on how to investigate the polytrauma patient in a timely and meaningful fashion.

Active Handout:Ferco H. Berger

http://abstract.rsna.org/uploads/2019/19000911/Active RC608-01.pdf

RC608-02 Whole-Body Trauma Completion CT for Transfer Patients: Impact on Injury Detection

Thursday, Dec. 5 9:00AM - 9:10AM Room: S401CD

Participants
Jeffrey Y. Shyu, MD, Boston, MA (*Presenter*) Nothing to Disclose
Reza Askari, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Roger Lacson, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Aaron D. Sodickson, MD,PhD, Boston, MA (*Abstract Co-Author*) Institutional research agreement, Siemens AG; Speaker, Siemens AG; Speaker, General Electric Company
Ali Salim, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Bharti Khurana, MD, Brookline, MA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jshyu@bwh.harvard.edu

PURPOSE

Indications for whole-body trauma CT are unclear. This study evaluates patients transferred to a level 1 trauma center, who had

selective CT at the originating hospital and completion whole-body CT at the accepting hospital, to determine if additional CT imaging detects clinically significant injury.

METHOD AND MATERIALS

This was a single center study at a level 1 trauma center with a dedicated Emergency Radiology division. 243 consecutive trauma patients transferred from outside hospitals were included from 9/6/2015 to 12/20/2015. A review of the patient's acute traumatic injuries was obtained from chart reviews, radiology reports, and abbreviated injury scale (AIS). Whole-body CT was defined as CTs of the head, cervical spine, chest, abdomen, and pelvis. A patient is considered to have had 'completion' CT imaging if she or he obtained some of the whole-body CT components at the outside institution, and the rest at the accepting institution. Injuries that were detectable with radiographs (such as extremity fractures) were excluded.

RESULTS

35 received whole-body CT at the outside institution, and 45 received completion CT at the accepting institution. Of those who received completion CT, 13 (29%) had additional injuries on completion CTs that were not detected on CTs or radiographs from the outside institution. An additional 9 patients had indeterminate injuries in the radiology report that were not given a corresponding AIS. The additional injuries with AIS scores were subdural hemorrhage (1 patient), rib fractures (5), clavicle fracture (1), and thoracic (4) and lumbar (5) spine fractures. One patient who died in the trauma completion group had a lumbar spine fracture found on completion imaging, not considered to be the primary cause of death. Average ISS of transfer patients who received whole-body CTs at the outside institution was 13.9, compared to 10.6 for the completion group. A statistically significant difference between ISS was found between the transfer whole-body group and completion CT group ($p = 0.044$).

CONCLUSION

Completion whole-body CT for trauma transfer patients detects additional injuries in 29% of patients. Rib and spinal fractures are the most commonly detected injuries. Further work is needed to determine if this increase in diagnostic yield translated into patient management changes.

CLINICAL RELEVANCE/APPLICATION

This study clarifies the role of whole-body completion CT for patients with major trauma.

RC608-03 Unsupervised Detection of Multiple Traumatic Lesions in Severe Trauma Patients on Whole-Body CT Using Anomaly Detection with Generative Adversarial Networks (GANs)

Thursday, Dec. 5 9:10AM - 9:20AM Room: S401CD

Participants
Yura Ahn, MD, Seoul , Korea, Republic Of (*Presenter*) Nothing to Disclose
Gil-Sun Hong, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyun-Jin Bae, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Co-founder, Promedius Inc; CEO, Promedius Inc
Jihye Yun, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Namkug Kim, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Stockholder, Coreline Soft, Co Ltd; Stockholder, Anymedi, Inc
Younghwa Byeon, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sungwon Park, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Young Ji Song, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Won-Jung Chung, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

foryourmiracle@gmail.com

PURPOSE

Supervised learning has limitation in that it requires a large amount of annotated data. The purpose of this study is to determine if anomaly detection with generative adversarial networks (AnoGANs) are useful for detecting multiple various traumatic lesions on whole-body CT (WBCT) in an unsupervised manner.

METHOD AND MATERIALS

We trained a Progressive Growing of GAN (PGGAN) to generate realistic artificial CT images, using the training set of 11,775 normal chest and/or abdominopelvic CT scans (172,249 chest slices and 301,584 abdominopelvic slices). Test set consisted of total 200 axial slices of WBCT images (100 abnormal and 100 normal images) in trauma patients. Using our simplified AnoGAN model, PGGAN-trained generator yields a corresponding realistic fake image to a given test image by minimizing mean square error between the fake and the test images. The differences between the fake and the test image on attention maps can detect and localize abnormal findings. For evaluation of the detection performance, we defined 7 clinically significant traumatic lesions (hemothorax, hemomediastinum, pneumothorax, pneumomediastinum, hemoperitoneum, hemoretroperitoneum and pneumoperitoneum). If the attention map partially included the traumatic lesions, it was considered a positive detection.

RESULTS

Total sensitivity per slice was 95.0% (95/100) and total sensitivity per lesions was 94.4% (135/143). For each traumatic lesion, sensitivity was 100% for hemothorax, 95.2% for hemomediastinum, 95.5% for pneumothorax, 93.3% for hemoperitoneum, 84.6% for hemoretroperitoneum, and 100% for pneumoperitoneum. Evaluation of other parameters of performance was limited due to difficult quantification and calculation of non-pathologic false positives.

CONCLUSION

We suggest that unsupervised learning of GANs using healthy dataset can be used to detect multiple traumatic lesions on unseen data and has high sensitivity to detect anomalies.

CLINICAL RELEVANCE/APPLICATION

We propose that this model can be useful to develop deep learning algorithm to screen emergency or traumatic patients with multiple various lesions.

RC608-04 Incidence of Blunt Cerebrovascular Injuries and Anoxic Brain Injury in the Setting of Self-Inflicted Hanging

Thursday, Dec. 5 9:20AM - 9:30AM Room: S401CD

Participants
Jean Mutambuze, BS, Indianapolis, IN (*Presenter*) Nothing to Disclose
Stephen F. Kralik, MD, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose
Scott D. Steenburg, MD, Zionsville, IN (*Abstract Co-Author*) Institutional research collaboration, IBM Corporation

For information about this presentation, contact:

ssteenbu@iuhealth.org

PURPOSE

Near hanging injuries are included as a high risk mechanism for the development of blunt cerebrovascular injuries (BCVI), despite there being a paucity of evidence-based data in support of this practice. As a result, this group of patients has been coalesced under the BCVI group which includes a myriad of different mechanisms of injury. The purpose of this study was to determine the incidence of BCVI in a large series of self-inflicted hanging patients who received neck CTA, and to guide appropriate diagnostic imaging in this specific group.

METHOD AND MATERIALS

A 10-year retrospective review of self-inflicted hanging patients who received neck CTA at two urban Level 1 trauma centers was performed. The medical record was used to confirm self-inflicted hanging mechanism of injury, as well as key demographic data, airway status, physical exam findings, neurological status and deficits, drug screen results, and mortality. Neck CTA were evaluated for neck arterial injuries, cervical spine fractures and signs of ligamentous injury. CT Head and/or MRI brain exams performed during hospitalization were evaluated for infarction and ischemic brain injury. A Fisher's exact test was used to compare variables associated with patients with positive versus negative neck CTA exams with $p < 0.05$ considered statistically significant.

RESULTS

A total of 151 patients (mean age 31.6 years) of which 113 were male (74.8%) were included for analysis. Five patients (3.3%) were diagnosed with BCVI. A total of 74% had abnormal neck examination, 64% had abnormal drug screen, 63% had GCS <15, 33% were intubated, 30% had abnormal neurologic examination, 15.2% had anoxic brain injury resulting in death, and 0% had cervical spine fracture or ligamentous injury. Neurological deficit (p=0.027), and mortality (p=0.03) were significantly higher in CTA positive patients, while abnormal neck examination (p=1.0), positive drug screen (p=1.0) and intubation (p=0.33) were not significantly different.

CONCLUSION

The incidence of BCVI among patients with self-inflicted hanging was 3.3%. A total of 15% of patients died due to anoxic brain injury.

CLINICAL RELEVANCE/APPLICATION

The incidence of BCVI in the setting of self-inflicted hanging is similar to that seen in other high risk mechanisms of injury. Thus including hanging injuries as a high risk mechanism for screening neck CTA remains prudent. Death due to anoxic brain injury poses a greater risk than that of BCVI.

RC608-05 Follow-up CT Imaging Post Liver Trauma: When is the Best Time to Image?

Thursday, Dec. 5 9:30AM - 9:40AM Room: S401CD

Participants
Aurelio Cosentino, MD, Torino, Italy (*Abstract Co-Author*) Nothing to Disclose
Dylan Lewis, MBBCh, FRCR, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Bhavna Batohi, MBBS, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Lisa M. Meacock, MBBS, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Adeel E. Syed, FRCR,MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose

PURPOSE

The purpose of the study is to determine the value of liver injury CT grade in predicting the potential for subacute/late complications, and to determine the ideal timing of follow-up (FU) CT imaging to detect complications.

METHOD AND MATERIALS

From August 2017 to July 2018, 58 major trauma patients (Pts) were diagnosed with liver injury. In this retrospective observational study, the admission CT and relevant clinical data were available for 53 Pts (43 male, 10 female; mean age 37.2 years ±18.2). Hepatic injuries detected on the admission CT were graded by two trauma radiologists using the AAST grading system. Mechanism of injury, liver-related subacute/late complications, and timing of follow-up CT imaging were reviewed.

RESULTS

The mechanisms of injury were as follows: vehicle incident/collision (n=25), fall >2 m (n=16), fall <2 m (n=1), penetrating trauma (n=10), rugby injury (n=1). There were 6 grade I liver injuries, 14 grade II, 14 grade III, 15 grade IV, and 4 grade V. Two Patients died within 30 days from presentation. Liver-related complications were observed in 10 patients (see Table) and included bilomas, biliary stricture and vascular complications. A statistically significant correlation between penetrating trauma and the occurrence of complications was observed (p<0.014). No correlation was observed between the injury grade and the trauma mechanism or the occurrence of complications. In 50% of cases, the complication was identified at FU CT within 7 days from the trauma (mean 6 days, range 5-7), in 50% of cases it was identified at further FU CT (mean 14 days, range 9-55).

CONCLUSION

Independent of the CT injury grade, a higher incidence of liver related complications occured with penetrating than a blunt

mechanism of trauma. An initial follow-up CT between 5 and 7 days after the trauma is adequate to reveal early liver-related complications, but a subsequent FU CT within 15 days is recommended to detect complications in those patients with high grade liver injury.

CLINICAL RELEVANCE/APPLICATION

A follow-up CT 5-7 days after traumatic liver injury is adequate to reveal early complications, a FU CT within 15 days is recommended in patients with high-grade injury and in penetrating liver trauma

RC608-06 Diaphragmatic Trauma

Thursday, Dec. 5 9:40AM - 10:10AM Room: S401CD

Participants
Michael N. Patlas, MD,FRCPC, Hamilton, ON (*Presenter*) Speaker, Springer Nature

For information about this presentation, contact:

patlas@hhsc.ca

LEARNING OBJECTIVES

1) To review the radiological and surgical literature of the potential pitfalls in diagnosis of diaphragmatic injuries. 2) To describe direct and indirect signs of blunt and penetrating diaphragmatic injury. 3) To highlight factors affection detection of diaphragmatic injuries.

RC608-07 Bowel and Mesenteric Trauma

Thursday, Dec. 5 10:20AM - 10:50AM Room: S401CD

Participants
Michael E. O'Keeffe, MBBCh, Vancouver, BC (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

dr.meokeeffe@gmail.com

LEARNING OBJECTIVES

1) Review imaging pearls and pitfalls in the assessment of mesenteric injury in trauma patients. 2) Focus on the anatomy of the small and large bowel mesentery, patterns of mesenteric injury, and their appearance on MDCT. 3) Review specific CT appearance of isolated mesenteric injury and polytrauma cases.

ABSTRACT

The small and large bowel mesentery are all too frequently underestimated as potential sites of significant injury in the trauma patient. In fact many would now argue that the mesentery itself has enough individual anatomical components and physiological roles to be considered a separate organ within the human body . As such we need to review the mesentery as a unique anatomical entity . It demonstrates a recognizable pattern of injury on CT imaging. These "fingerprints of trauma" can be searched or in every case and provide a valuable guide to potentially serious bowel and vascular injury.

RC608-08 Role of CT in Predicting Therapeutic Operative Intervention in Cases of Suspected Bowel and Mesenteric Injuries Due to Blunt Abdominal Trauma

Thursday, Dec. 5 10:50AM - 11:00AM Room: S401CD

Participants
Muhammad O. Afzal, MD, MBBS, Memphis, TN (*Presenter*) Nothing to Disclose
Lou J. Magnotti, MD, Memphis, TN (*Abstract Co-Author*) Nothing to Disclose
Sridhar S. Shankar, MD, MBA, Memphis, TN (*Abstract Co-Author*) Equipment support, Clarius Mobile Health Corp
Dina Filiberto, MD, Memphis, TN (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

CT plays an important role in the workup of stable patients after blunt trauma. Suspected bowel or mesenteric injuries (BBMI) often present with subtle and inconsistent imaging findings. Various radiographic signs have been used to predict the presence of these injuries. However, the optimal predictor for BBMI remains controversial. It is our contention that one of the best predictors is the overall impression of the reviewing radiologist. Thus, the purpose of this study was to identify radiographic predictors of therapeutic operative intervention in patients after blunt abdominal trauma.

METHOD AND MATERIALS

Patients with a discharge diagnosis of a mesenteric injury after blunt trauma were identified over a 5-year period. Admission CT scans were reviewed for potential predictors of BBMI, including mesenteric hematoma, acute arterial extravasation, bowel wall hematoma, bowel devascularization, fecalization of small bowel, free air, fat pad injury. In addition, the overall impression of the scan by the reviewing radiologist was recorded. Patients were then stratified by therapeutic laparotomy and compared. Multivariable logistic regression (MLR) was then used to identify predictors of therapeutic laparotomy.

RESULTS

Over the study, 114 patients underwent operative intervention: 75 patients (66%) underwent therapeutic laparotomy. After adjusting for the above predictors including the overall impression of the radiologist, MLR identified the impression of the radiologist (OR 3.14; 95%CI 1.19-8.27, p=0.021), fat pad injury (OR 3.5; 95%CI 1.24-9.99, p=0.018) and bowel devascularization (OR 8.2; 95%CI 0.962-9.91, p=0.054) as independent predictors of therapeutic laparotomy. Interestingly, the overall impression of the radiologist had a positive predictive value of 82.1%.

CONCLUSION

CT remains vital in the evaluation of patients suspected of having bowel and mesenteric injuries after blunt trauma. An experienced radiologist remains invaluable in assessing often subtle signs of BBMI. A simplified scoring system utilizing these predictors could potentially aid the radiologist and surgeons in identifying those patients that would benefit from early operative intervention.

CLINICAL RELEVANCE/APPLICATION

CT helps identify stable patients suspected of mesenteric/bowel injuries who would benefit from early operative intervention.

RC608-09 Damage Control Surgery CT: An Analysis in Diagnosing Abdominopelvic Surgically Significant Injuries

Thursday, Dec. 5 11:00AM - 11:10AM Room: S401CD

Participants
Zohaib Ahmad, MD, Boston, MA (*Presenter*) Nothing to Disclose
Arthur Baghdanian, 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*) Royalties, Reed Elsevier
Stephan W. Anderson, MD, Cambridge, MA (*Abstract Co-Author*) Research Grant, General Electric Company Research Grant, Koninklijke Philips NV
Armonde Baghdanian, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

zohaib.ahmad@bmc.org

PURPOSE

To evaluate the incidence in diagnosis and misses of surgically relevant abdominopelvic injuries on computed tomography (CT) imaging in the Damage Control (DC) patient.

METHOD AND MATERIALS

This retrospective study was IRB approved and HIPAA compliant. Informed consent was waived. Patients aged 18 and older who sustained blunt or penetrating trauma requiring DC surgery without a prior CT at Boston Medical Center 2/21/2005 - 9/26/2018 were included. 59 patients met inclusion criteria (52 male, 4 female, mean age of 29). A CT was obtained 24 hours after the initial surgery. Each study was assessed by a single blinded fellowship trained radiologist. Outcomes were evaluated through failed surgical repair warranting surgical intervention, a clinically significant injury discovered on CT in a surgically explored area, a clinically significant injury discovered on CT in a surgically unexplored area, and a clinically significant injury missed on the initial CT but found on later surgery/imaging. These categorical variables were evaluated by percentages.

RESULTS

In a cohort of 57 patients, a total of 7 (12.5%) patients had a failed surgical repair discovered on initial CT (12.3%); of those 7 patients, 3 (42.8%) had failed repair of the liver. 6 (10.7%) patients had a clinically significant injury discovered on CT in a surgically explored area; of those 6 patients, 2 (33.3%) had injury of the kidney. 6 (10.7%) patients had a clinically significant injury discovered on CT in a surgically unexplored area. 9 (16.1%) patients who had a clinically significant injury that was missed on the initial CT; of those 9 patients, 3 (33.3%) had a missed injury to the large bowel.

CONCLUSION

As a staged surgical process in a critically traumatic injured patient, Damage Control (DC) surgery is a burgeoning life-saving method to address both traumatic and metabolic derangements in a timely manner. Further knowledge of common surgically and radiographically missed injuries is important to provide accurate diagnoses in these patients especially in the retroperitoneum and gastrointestinal system.

CLINICAL RELEVANCE/APPLICATION

Accurate interpretation of computed tomography (CT) imaging during this process is vital to assessing for any surgically missed injury or assessment of repair in the critically ill DC patient.

RC608-10 Diagnostic Performance of Triple-Contrast versus Single-Contrast Multi-Detector Computed Tomography for the Evaluation of Penetrating Bowel Injury

Thursday, Dec. 5 11:10AM - 11:20AM Room: S401CD

Participants
Fabio M. Paes, MD, Miami, FL (*Presenter*) Nothing to Disclose
Anthony M. Durso, MD, Miami, FL (*Abstract Co-Author*) Nothing to Disclose
Kim M. Caban, MD, Miami , FL (*Abstract Co-Author*) Nothing to Disclose
Brian Covello, MD, Miami, FL (*Abstract Co-Author*) Nothing to Disclose
Daniel Suarez, MD, Bogota, Colombia (*Abstract Co-Author*) Nothing to Disclose
Douglas S. Katz, MD, Mineola, NY (*Abstract Co-Author*) Nothing to Disclose
Felipe Munera, MD, Key Biscayne, FL (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

fpaes@med.miami.edu

PURPOSE

Selecting low risk penetrating trauma patients to forego laparotomy can be challenging. Bowel injury may prevent nonoperative management. Our goal is to compare the diagnostic performance of triple-contrast (oral, rectal, and IV) against IV contrast only CT in detecting bowel injury from penetrating abdominopelvic trauma, using surgical diagnosis during exploratory laparotomy as standard.

METHOD AND MATERIALS

997 patients who underwent CT for penetrating trauma between 2009-2016 were enrolled in this IRB-approved retrospective cohort study. A total of 143 patients, including 15 females (ages 16-41), and 123 males (ages 14-83) underwent preoperative CT followed by exploratory laparotomy. Of these, 56 patients received triple-contrast CT. CT examinations were reviewed by 2 attending radiologists, blinded to surgical outcome and clinical presentation. Direct and indirect signs of bowel injury were documented. Results were stratified by contrast type and mechanism of injury and subsequently compared based upon diagnostic performance indicators of sensitivity, specificity, NPV, and PPV. AUCs were analyzed for determination of diagnostic accuracy.

RESULTS

Bowel injury was present in 45 out of 143 patients. Specificity and accuracy were higher with triple-contrast CT (98% specific [0.95, 1.00]), 97-99% accurate) compared to IV contrast only CT (66% specific [0.56, 0.75], 78-79% accurate). Sensitivity was highest with IV contrast only CT (91% sensitive [0.85, 0.98]) compared with triple-contrast CT (75% sensitive [0.56, 0.94]), although not statistically significant. Triple contrast CT increased diagnostic accuracy for both reviewers regardless of mechanism of injury. For reader 1, diagnostic accuracy with triple contrast CT versus IV contrast only CT was (99% [0.98, 1.00]) vs. 80% [0.62, 0.97]) for stab wounds and (100% vs. 76%[0.61, 0.91]) for gunshot wounds. For reader 2, diagnostic accuracy with triple-contrast CT versus IV contrast only CT was (99% [0.98, 1.00] vs. 74%, [0.55, 0.92]) for stab wounds and (95% [0.85, 1.00] vs. 79% [0.66, 0.92]) for gunshot wounds.

CONCLUSION

In our retrospective study, triple-contrast CT had greater accuracy, specificity, and NPV when compared to IV contrast only CT in evaluating for bowel injury from penetrating wounds.

CLINICAL RELEVANCE/APPLICATION

Triple-contrast CT has greater accuracy, specificity, and NPV when compared to IV contrast only CT in evaluating for bowel injury from penetrating trauma.

RC608-11 Multi-Institutional Observational Study of Detection, Treatment and Outcomes of Splenic Vascular Injuries Discovered at CT

Thursday, Dec. 5 11:20AM - 11:30AM Room: S401CD

Participants
James T. Lee, MD, Lexington, KY (*Presenter*) Nothing to Disclose
Christina A. LeBedis, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Emily Slade, PhD, Lexington, KY (*Abstract Co-Author*) Nothing to Disclose
Armonde Baghdanian, MD, San Francisco, CA (*Abstract Co-Author*) Nothing to Disclose
Nagaramesh Chinapuvvula, MBBS, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Richard Tsai, MD, St. Louis, MO (*Abstract Co-Author*) Nothing to Disclose
Ken F. Linnau, MD, Seattle, WA (*Abstract Co-Author*) Royalties, Cambridge University Press Research Grant, Siemens AG
Scott D. Steenburg, MD, Zionsville, IN (*Abstract Co-Author*) Institutional research collaboration, IBM Corporation
Suzanne T. Chong, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
Arthur Baghdanian, MD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Demetrios A. Raptis, MD, Frontenac, MO (*Abstract Co-Author*) Nothing to Disclose
Kathirkamanathan Shanmuganathan, MD, Baltimore, MD (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jtlee3@uky.edu

PURPOSE

Report trends for treating splenic injuries from 8 US trauma centers over 7 years Evaluate the frequency of reported splenic vascular injuries Evaluate factors influencing surgeon's decision to invasively treat (surgery or embolization) or conservatively manage

METHOD AND MATERIALS

IRB approved, retrospective review of splenic injuries recorded from Level 1 trauma registries over 7 years from 8 institutions. Inclusion: Adults (>=18) with blunt splenic trauma, CT within 12 hours of admission Exclusion: penetrating trauma to the abdomen/pelvis, splenectomy prior to CT, left AMA, CT <16 detector, and death before splenic treatment. Descriptive statistics as well as regression analysis was performed, adjusting for multiple covariates.

RESULTS

918 subject were identified, 776 met inclusion criteria. 268 female. Original CT reports indictated active splenic hemorrhage (ASH) in 25%. 36% received invasive treatment (14% IR, 22% OR) and 64% were managed conservatively. A steady increase in IR management of splenic injuries and respective decrease in operative and conservative management over the study period. Multinomial logistic regression was performed for multiple outcomes including odds of recieving embolization or operative treatment and length of stay. Not surprisingly, AIS spleen, AIS Head/Neck and ISS scores showed significant increase in odds for invasive treatment. Presence of ASH on CT report was extremely predictive of invasive treatment when compared to conservative observation: Odds ratios for embolization: 22.063 and for operative 9.374 (while controlling for gender, age, synchronous major organ injury, vital signs, hemoglobin, INR, Platelets and if blood products received at admission). Regarding length of stay, on average, for every one unit increase in ISS, the length of stay increases by 1.031 days. Interestingly, on average, ASH demonstrated a 0.933 days longer than those without ASH; however this was not statistically significant (p=0.961).

CONCLUSION

We observed changing trends in treatment of splenic vascular injuries over the study period, as well as institutional differences in utilization of embolization versus operative management. Radiologic description of active splenic extravasation was highly predictive of embolization

CLINICAL RELEVANCE/APPLICATION

Radiologist detection of active hemorrhage or contained vascular injury is highly predictive of invasive treatment of blunt splenic

injury

RC608-12 Pancreatic Trauma

Thursday, Dec. 5 11:30AM - 12:00PM Room: S401CD

Participants
Jorge A. Soto, MD, Boston, MA (*Presenter*) Royalties, Reed Elsevier

For information about this presentation, contact:

jorge.soto@bmc.org

LEARNING OBJECTIVES

1) Review key direct and indirect CT findings of blunt pancreatic trauma. 2) Highlight potential pitfalls in diagnosis of pancreatic trauma. 3) Understand proper utilization of MR in patients with suspected pancreatic injuries.

RC609

Case Review: Rectal MRI (Interactive Session)

Thursday, Dec. 5 8:30AM - 10:00AM Room: E451B

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Special Information

Participants will review cases on their own devices and answer questions. The cases will then be reviewed by the presenters. Note: this activity is best done on a laptop or tablet. Although phones will work, their small size limits optimal image view.

Sub-Events

RC609A Rectal MR Cases - Set 1

Participants
David H. Kim, MD, Middleton, WI (*Presenter*) Shareholder, Cellectar Biosciences, Inc; Shareholder, Elucent Medical;

LEARNING OBJECTIVES

1) Identify key anatomic landmarks that are helpful in rectal cancer staging at MR. 2) Critically evaluate whether tumor is contained or extends past the muscularis propria of the rectum. 3) State the criteria for regional lymph node positivity at MR.

RC609B Rectal MR Cases - Set 2

Participants
Elena K. Korngold, MD, Portland, OR (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

korngold@ohsu.edu

LEARNING OBJECTIVES

1) To interactively view rectal MRI cases and incorporate salient teaching points, with self and group evaluation during the process, building towards an understanding of practical rectal MRI for rectal cancer staging. 2) To gain working knowledge of anatomy and MRI findings to optimally interpret and report on rectal cancer staging and features.

RC609C Rectal MR Cases - Set 3

Participants
Zahra Kassam, MD, London, ON (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

zahra.kassam@sjhc.london.on.ca

LEARNING OBJECTIVES

1) Provide overview of MR imaging in rectal cancer staging. 2) Highlight pearls and pitfalls in technique and interpretation, to increase staging accuracy. 3) Review reporting guidelines pertinent to rectal MR staging.

RC609D Rectal MR Cases - Set 4

Participants
Mukesh G. Harisinghani, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

MHARISINGHANI@MGH.HARVARD.EDU

LEARNING OBJECTIVES

1) Provide overview of MR imaging in rectal cancer staging. 2) Highlight important technical pointers for accurate staging.

RC610

Abdominal Doppler: What You Need to Know

Thursday, Dec. 5 8:30AM - 10:00AM Room: E351

GI US VA

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Sub-Events

RC610A Ultrasound Evaluation of the Aorta and Mesenteric Arteries

Participants
Leslie M. Scoutt, MD, Essex, CT (*Presenter*) Speaker, Koninklijke Philips NV

For information about this presentation, contact:

leslie.scoutt@yale.edu

LEARNING OBJECTIVES

1) Discuss the role of ultrasound in screening for abdominal aortic aneurysms and following endograft repair. 2) Describe the ultrasound appearance of aortic and superior mesenteric artery dissections. 3) Discuss the role of ultrasound in the evaluation of mesenteric ischemia.

ABSTRACT

This presentation will review the role of ultrasound in evaluation of common aortic and mesenteric artery pathology. The focus will be on how and why to screen for abdominal aortic aneurysms and the evolving role of ultrasound in the follow up of endograt aortic repair. The role of ultrasound in the evaluation of clinically suspected aortic dissections and in the evaluation of mesenteric ischemia will also be described. More unusual aortic and mesenteric vascalar pathology as well as mimics will also be briefly presented as challenge cases.

RC610B Liver/TIPS Doppler

Participants
Mark E. Lockhart, MD, Birmingham, AL (*Presenter*) Author, Oxford University Press; Author, Reed Elsevier; Editor, John Wiley & Sons, Inc; Deputy Editor, Journal of Ultrasound in Medicine

LEARNING OBJECTIVES

1) To gain an understanding of normal Doppler appearance of hepatic vessels. 2) To gain an understanding of the sonographic appearance of common liver diseases. 3) To review the normal and abnormal Doppler criteria related to TIPS shunts.

ABSTRACT

This lecture will initially review basic Doppler concepts related to the liver and cover basic appearance of liver vessel flow. It will then describe the Doppler appearance of the most common hepatic disease processes and their sonographic appearance. Finally, the lecture will depict several examples of abnormalities associated with TIPS shunts and their Doppler criteria for diagnosis.

RC610C Renal Doppler

Participants
Deborah J. Rubens, MD, Rochester, NY (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

Deborah_rubens@urmc.rochester.edu

LEARNING OBJECTIVES

1) Discuss the applications of Doppler US in renal vascular as well as parenchymal disease. 2) Review the critical technical parameters which enable accurate diagnoses. 3) Highlight the important pitfalls in renal Doppler imaging.

ABSTRACT

This presentation 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 addressed. 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. Surgical emergencies will be highlighted and the role of correlative imaging with CT, MR and/or angiography will be presented.

RC610D Understanding Hepatic Transplants: Not Just Chopped Liver

Participants

Jonathan D. Kirsch, MD, Branford, CT (*Presenter*) Consultant, FUJIFILM Holdings Corporation

For information about this presentation, contact:

jonathan.kirsch@yale.edu

LEARNING OBJECTIVES

1) Gain an understanding of the indications and contraindications for liver transplant. 2) Know the relevant post-operative anatomy for orthotopic liver transplant. 3) Be able to recognize and diagnose common vascular, biliary, and parenchymal complications related to the liver transplant in the postoperative period.

ABSTRACT

Liver transplantation has become the treatment of choice and standard of care for end-stage liver disease. As liver transplants become more commonly seen outside specialized academic centers, it becomes imperative to be familiar with the imaging related to liver transplantation. This talk will review the indications and contraindications of liver transplant, the post-operative anatomy seen for orthotopic liver transplants, and review the imaging findings of common post-operative vascular, biliary, and parenchymal complications that can be seen.

Printed on: 10/29/20

RC617

Emerging Technology: Elastography of the Liver - Update 2019

Thursday, Dec. 5 8:30AM - 10:00AM Room: S505AB

GI MR US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Richard L. Ehman, MD, Rochester, MN (*Moderator*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc;

LEARNING OBJECTIVES

1) To understand how elastography measurements are integrated into the management of patients with chronic liver disease. 2) To learn imaging techniques and protocols of ultrasound and MR elastography. 3) To compare US and MR elastography in assessing liver fibrosis. 4) To review emerging clinical indications of US and MR elastography. 5) To understand limitations of current elastography techniques.

Sub-Events

RC617A Elastography of the Liver: Why Clinicians Use It

Participants
Alina Allen, Rochester, MN (*Presenter*) Research support, Gilead Sciences, Inc

For information about this presentation, contact:

allen.alina@mayo.edu

LEARNING OBJECTIVES

1) Recognize the importance of fibrosis estimation in liver disease. 2) Assess the role of elastography in clinical practice.

RC617B MR Elastography: Update 2019

Participants
Richard L. Ehman, MD, Rochester, MN (*Presenter*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc;

LEARNING OBJECTIVES

1) To be able to understand the basic physical principles of MR Elastography (MRE). 2) To be able to describe the clinical indications for MRE in liver disease. 3) To be able to describe published evidence on the diagnostic performance of MRE in assessing liver fibrosis. 4) To be able to compare ultrasound based elastography to MRE. 5) To be able to describe the current limitations of MRE.

RC617C Ultrasound Elastography: Update 2019

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, Canon Medical Systems Corporation; Research Grant, Esaote SpA; Research Grant, BK Ultrasound; Research Grant, Hitachi, Ltd

LEARNING OBJECTIVES

1) Understand the clinical indications of ultrasound elastography (USE). 2) Learn about the various techniques and imaging protocols of USE. 3) Review the diagnostic accuracy of USE in the assessment of elasticity in liver fibrosis and other clinical applications in the body. 4) Compare USE with MR elastography. 5) Understand current limitations of USE.

ABSTRACT

Ultrasound elastography (USE) is a general term for various techniques available for objectively and quantitatively assessing tissue stiffness using ultrasonic techniques, creating noninvasive images of mechanical characteristics of tissues. Elastography is based on the fact that the elasticity of a tissue is changed by pathological or physiological processes. For example, cancer or fibrosis associated with various disease processes including chronic liver disease or chronic pancreatitis result in increased tissue stiffness.Recently, various USE techniques have been cleared by the FDA and all major ultrasound companies offer different approaches of measuring tissue stiffness on their ultrasound machines.The objective of this talk is to familiarize the audience with the clinical indications, imaging techniques and protocols, interpretation, diagnostic accuracy, and limitations of the various USE technique for assessment of tissue stiffness, with special focus on assessment of fibrosis in chronic liver disease.

RC624

Best Cases from the AIRP (In Conjunction with the American Institute for Radiologic Pathology) (Interactive Session)

Thursday, Dec. 5 8:30AM - 10:00AM Room: S404CD

CH GI GU MK NR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Mark D. Murphey, MD, Silver Spring, MD (*Moderator*) Nothing to Disclose

For information about this presentation, contact:

mmurphey@acr.org

laurabancroftmd@gmail.com

Special Information

This interactive session will use RSNA Diagnosis Live™. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

LEARNING OBJECTIVES

1) Describe the importance of radiologic-pathologic correlation in evaluation of lesions involving the chest, nervous system, abdomen and musculoskeletal regions. 2) Identify imaging features that can limit our radiologic differential diagnosis based on radiologic-pathologic correlation using a case-based interactive learning environment. 3) Understand the pathologic basis for the distinct imaging appearances utilizing the best cases from the AIRP.

Sub-Events

RC624A Thoracic

Participants
Jeffrey R. Galvin, MD, Baltimore, MD (*Presenter*) Nothing to Disclose

RC624B Neuroradiology

Participants
Kelly K. Koeller, MD, Rochester, MN (*Presenter*) Nothing to Disclose

RC624C Genitourinary

Participants
Darcy J. Wolfman, MD, Washington, DC (*Presenter*) Nothing to Disclose

RC624D Gastrointestinal

Participants
Maria A. Manning, MD, Silver Spring, MD (*Presenter*) Nothing to Disclose

RC624E Musculoskeletal

Participants
Mark D. Murphey, MD, Silver Spring, MD (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

mmurphey@acr.org

SSQ06

Gastrointestinal (Oncology)

Thursday, Dec. 5 10:30AM - 12:00PM Room: S103AB

GI OI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Andrew D. Smith, MD, PhD, Birmingham, AL (*Moderator*) CEO, AI Metrics LLC ; Owner, AI Metrics LLC ; CEO, Radiostics LLC; Owner, Radiostics LLC; CEO, Liver Nodularity LLC ; Owner, Liver Nodularity LLC ; Research Grant, General Electric Company; Speaker, Canon Medical Systems Corporation; Speaker, AlgoMedica, Inc
Carolyn L. Wang, MD, Seattle, WA (*Moderator*) Research Grant, General Electric Company
Erik K. Paulson, MD, Durham, NC (*Moderator*) Nothing to Disclose

Sub-Events

SSQ06-01 CT Resectability According to NCCN Criteria After Neoadjuvant FOLFIRINOX Chemotherapy for Borderline and Unresectable Pancreatic Ductal Adenocarcinoma

Thursday, Dec. 5 10:30AM - 10:40AM Room: S103AB

Participants
Jae Ho Byun, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jong Keon Jang, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Jihun Kang, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jung Hee Son, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jin Hee Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seung Soo Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyoung Jung Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Moon-Gyu Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To assess CT resectability according to NCCN criteria and associated CT findings for predicting R0 resection after neoadjuvant FOLFIRINOX chemotherapy in patients with pancreatic ductal adenocarcinoma (PDAC)

METHOD AND MATERIALS

Among 204 consecutive patients with PDAC who underwent neoadjuvant FOLFIRINOX therapy from 2013 to 2017, eligible patients fulfilled the following criteria were identified: 1) patients underwent both pre- and post-chemotherapy multiphase CT, 2) available pathologic result of resection margin, and 3) borderline or unresectable PDAC assessed on pre-chemotherapy CT according to NCCN criteria. We finally analyzed 64 patients (36 men; mean age, 58.8 years). For CT resectability after chemotherapy, two abdominal radiologists independently evaluated following CT findings: a) contact angle of artery or vein, b) involved depth of artery or vein, 3) degree of perivascular tumor enhancement of artery or vein in portal venous phase, and 4) tumor size and enhancement. Change in CT resectability before and after therapy was classified as regression, stable or progression. Inter-reader agreement was evaluated using intraclass correlation coefficient (ICC). Uni- and multi-variate logistic analyses were used to identify R0 resection-associated CT findings.

RESULTS

ICC for CT findings ranged from 0.64 to 0.94. R0 resection was achieved in 67% (6/9), 72% (23/32) and 68% (15/22) patients with resectable, borderline and unresectable PDAC, respectively. Sensitivity and specificity of CT resectability (resectable & borderline vs. unresectable) for R0 resection were 66% and 37%, respectively. R0 resection was made in 58% (11/19), 74% (24/31) and 69% (9/13) patients with regression, stable and progression, respectively. Sensitivity and specificity of change in CT resectability (regression & stable vs. progression) for R0 resection were 80% and 21%, respectively. On univariate analysis, low perivascular tumor enhancement of artery or vein was significant. Low perivascular enhancement of vein (<=42.5 HU; odds ratio, 6.50; P<.02) was independently associated with R0 resection on multivariate analysis.

CONCLUSION

CT resectability according to NCCN criteria after neoadjuvant chemotherapy was sensitive but not specific for assessing R0 resection. The degree of perivascular tumor enhancement may have added values to predict R0 resection.

CLINICAL RELEVANCE/APPLICATION

Efficacy of CT resectability after neoadjuvant FOLFIRINOX chemotherapy

SSQ06-02 MDCT-Based Radiomic Signature as A Predictor of Disease-Free Survival: Bringing Promotion to Preoperative Clinical Model of Gastric Cancer

Thursday, Dec. 5 10:40AM - 10:50AM Room: S103AB

Participants
Siwen Wang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Caizhen Feng, MBChB, Beijing, China (*Presenter*) Nothing to Disclose
Di Dong, PhD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Haidong Xiang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Xiaoxuan Jia, MA, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yingjiang Ye, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Nan Hong, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Yi Wang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Jie Tian, PhD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

fengcaizhen2016@163.com

PURPOSE

To establish a contrast-enhanced multiple-row detector computed tomography (MDCT)-based radiomic signature for disease-free survival (DFS) prediction in gastric cancer and validate its incremental value to the preoperative clinical risk model.

METHOD AND MATERIALS

A total of 249 gastric cancer patients in this retrospective study were randomly divided into a training cohort (n=166) and a validation cohort (n=83) at a ratio of 2:1. Two-dimensional radiomic feature extraction was conducted based on tumor volumes of interest from portal venous phase MDCT images. The least absolute shrinkage and selection operator penalized Cox proportional hazards regression was used to select radiomic features and establish a radiomic signature. A radiomic nomogram in combination with the radiomic signature and significant clinical factors was developed by multivariate Cox regression. Model 1 (radiomic signature), model 2 (clinical model), and model 3 (radiomic nomogram) were evaluated in terms of discrimination, calibration, and clinical usefulness.

RESULTS

A four-feature radiomic signature showed good stratification ability in gastric cancer patients with high-risk and low-risk of DFS in both cohorts (training cohort: hazard ratio [HR] = 2.718, $P < 0.001$; validation cohort: HR = 1.825, $P < 0.05$). Univariate radiomic feature indicated good predictive performance with Harrell's concordance indices (shape feature, 0.664; first-order feature, 0.625; two texture features, 0.543 and 0.487). The radiomic nomogram (model 3) combining the radiomic signature and two significant clinical factors (AFP and EMVI defined on MDCT) demonstrated the best performance over model 1 and model 2 with a concordance index of 0.721 (95% confidence interval [CI], 0.648-0.793) as well as good fitness by calibration curves and great clinical usefulness by decision curves.

CONCLUSION

MDCT-based radiomic signature was established and validated as a preoperative predictor of DFS in gastric cancer patients, offering assistance to prognostic prediction and treatment decisions.

CLINICAL RELEVANCE/APPLICATION

For individualized treatment decision, prognosis of gastric cancer can be analyzed by radiomic approach based on high-throughput mining of quantitative image features from preoperative medical imaging.

SSQ06-03 Development of Prognostic Prediction Model of TACE for Hepatocellular Carcinoma Based on Radiomics Analysis of Preoperative DCE-MRI

Thursday, Dec. 5 10:50AM - 11:00AM Room: S103AB

Participants
Jianfei Tu, MD, Lishui, China (*Presenter*) Nothing to Disclose
Wei Weng, Lishui, China (*Abstract Co-Author*) Nothing to Disclose
Jingjing Song Jr, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Fazong Wu, Lishui, China (*Abstract Co-Author*) Nothing to Disclose
Xulu Wu, Lishui, China (*Abstract Co-Author*) Nothing to Disclose
Qiaoyou Weng, Seattle, WA (*Abstract Co-Author*) Nothing to Disclose
Zhongwei Zhao, Lishui, China (*Abstract Co-Author*) Nothing to Disclose
Minjiang Chen, Lishui, China (*Abstract Co-Author*) Nothing to Disclose
Jiansong Ji, MD, Lishui , China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

tjf562878@gmail.com

PURPOSE

Transcatheter arterial chemoembolization (TACE) is the first-line treatment for hepatocellular carcinoma (HCC), but its efficacy often has individualized differences. The purpose of this study was to develop a precise prognostic model for TACE treatment of hepatocellular carcinoma based on dynamic contrast;enhanced magnetic resonance imaging (DCE-MRI).

METHOD AND MATERIALS

Retrospective collection of 107 pathologically confirmed liver cancer patients who underwent TACE in our hospital from January 2013 to June 2018 in present study. All patients underwent DCE-MRI before treatment and followed up for 3 months after TACE, who were further divided into effective group (n=70) and ineffective group (n=37) according to the reaction of the tumor based on

mRECIST criteria. The enrolled patients in the above two groups were randomly divided into a training set (n=74) and a validation set (n=33). Analysis Kit software was used to delineate the volume of interest (VOI) of lesions based on the contrast-enhanced T1-weighted images and extract a total of 396 quantitative texture parameters, which were further dimension reduction by Kruskal-Wallis (K- W) one-way ANOVA test, univariate logistic regression and LASSO algorithm, and selected the most useful features. The selected imaging features were then combined into a Rad score, which was further assessed by ROC curve analysis in the training and validation sets.

RESULTS

Six radiomic feature were finally selected to form the Rad score. The AUC for differentiating between effective group and ineffective group in the training set was 0.868 (95% CI: 0.802, 0.901), and the sensitivity and specificity were 73.5% and 88.2%, respectively. In the validation group, the AUC was 0.853 (95% CI: 0.782, 0.891), and the sensitivity and specificity were 81% and 82.6%, respectively.

CONCLUSION

A reliable TACE prognostic prediction model was developed based on the radiomics analysis of contrast-enhanced T1-weighted images, which is of great value for prognosis management of HCC patients undergoing TACE.

CLINICAL RELEVANCE/APPLICATION

A good and stable TACE short-term prognostic prediction model was constructed by using DCE-MRI based texture analysis, which is of great value for the management of HCC patients undergoing TACE.

SSQ06-04 Prognostic Value of Extracellular Volume Fraction Determined by Equilibrium Contrast-Enhanced CT in Patients with Pancreatic Adenocarcinoma Who are Scheduled for Chemoradiotherapy

Thursday, Dec. 5 11:00AM - 11:10AM Room: S103AB

Participants
Yutaka Toyomasu, MD, Tsu, Japan (*Presenter*) Nothing to Disclose
Yasutaka Ichikawa, MD, Tsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Motonori Nagata, MD, PhD, Tsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomoko Kawamura, Mie, Japan (*Abstract Co-Author*) Nothing to Disclose
Akinori Takada, MD, Koriyama, Japan (*Abstract Co-Author*) Nothing to Disclose
Naoki Nagasawa, RT, PhD, Tsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Kakuya Kitagawa, MD, PhD, Tsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshihito Nomoto, Tsu, Japan (*Abstract Co-Author*) Nothing to Disclose
Hajime Sakuma, MD, Tsu, Japan (*Abstract Co-Author*) Research Grant, EIZAI; Research Grant, DAIICHI SANKYO Group; Research Grant, FUJIFILM Holdings Corporation; Research Grant, Guerbet SA; Research Grant, Nihon Medi-Physics Co, Ltd;

PURPOSE

Several recent studies indicated that extracellular volume fraction (ECV) of the malignant tumors may be useful in evaluating tumor aggressiveness and response to therapy. The purpose of this study was to determine the prognostic value of ECV quantified by equilibrium contrast-enhanced CT obtained prior to chemoradiotherapy (CRT) in patients with pancreatic adenocarcinoma.

METHOD AND MATERIALS

Thirty-five patients with histologically-proven pancreatic adenocarcinoma who had no distant metastasis and underwent dynamic CT before treatment were retrospectively studied. Absolute enhancement in Hounsfield unit was determined for the tumor (Etumor) and aorta (Eblood) by placing regions-of-interest on pre-contrast and equilibrium-phase CT images. The tumor ECV was calculated as the following equation: ECV(%) = Etumor x (100 - hematocrit(%)) / Eblood. Univariate and multivariate analyses were performed to evaluate the value of the tumor ECV as well as age, sex, primary tumor site, tumor diameter, surgical indication, and CA19-9 for the prediction of progression-free survival (PFS) and overall survival (OS).

RESULTS

The median and interquartile range of ECV in pancreatic adenocarcinoma was 35.8% and 25.0 - 43.6% in all patients. During the median observation period of 23 months, 29 (83%) of 35 patients experienced disease recurrence (n=25) or death (n=19). Kaplan-Meier curves for PFS and OS according to the ECV are shown in Figure 1. In univariate analysis, the tumor ECV of > median (35.8%) was significantly associated with better prognosis for both PFS (p=0.017) and OS (p=0.003). Multivariate analysis revealed that tumor ECV was an independent prognostic factor for PFS (Hazard ratio [95% CI], 0.383 [0.165-0.889]; p=0.025) and OS (Hazard ratio [95% CI], 0.213 [0.069-0.660]; p=0.003).

CONCLUSION

Higher tumor ECV determined by pre-contrast and equilibrium-phase CT prior to CRT is significantly associated with better outcome in patients with pancreatic adenocarcinoma. The tumor ECV can be quantified by routine dynamic CT and has excellent prognostic value in patients with pancreatic adenocarcinoma.

CLINICAL RELEVANCE/APPLICATION

Tumor ECV quantified by equilibrium contrast-enhanced CT is a novel imaging biomarker that permits prediction of the prognosis in patients who are scheduled for CRT.

SSQ06-05 Baseline Clinical and Imaging Predictors of Treatment Response and Overall Survival of Patients with Metastatic Melanoma Undergoing Immunotherapy

Thursday, Dec. 5 11:10AM - 11:20AM Room: S103AB

Participants
Ahmed Othman, MD, Tubingen, Germany (*Presenter*) Nothing to Disclose
Amadeus Schraag, Tubingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Saif Afat, MD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Sergios Gatidis, MD, Tubingen, Germany (*Abstract Co-Author*) Nothing to Disclose

Thomas Eigentler, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose
Bernhard Klumpp, MD, Tuebingen, Germany (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ahmed.e.othman@googlemail.com

PURPOSE

We aimed to identify predictive clinical and CT imaging biomarkers and assess their predictive capacity regarding overall survival (OS) and treatment response in patients with metastatic melanoma undergoing immunotherapy.

METHOD AND MATERIALS

The local institutional ethics committee approved this retrospective study and waived informed patient consent. 103 patients with immunotherapy for metastatic melanoma were randomly divided into training (n= 69) or validation cohort (n=34). Baseline tumor markers (LDH, S100B), baseline CT imaging biomarkers (tumor burden, Choi density) and CT texture parameters (Entropy, Kurtosis, Skewness, uniformity, MPP, UPP) of the largest target lesion were extracted. To identify treatment response predictors, binary logistic regression analysis was performed in the training cohort and tested in the validation cohort. For OS, Cox regression and Kaplan Maier analyses were performed in the training cohort. Bivariate and multivariate models were established. Goodness of fit was assessed with Harrell's C-index. Potential predictors were tested in the validation cohort also using Cox-regression and Kaplan-Meier analyses.

RESULTS

Baseline S100B (Hazard ratio(HR)= 2.543, p0.018), tumor burden (HR=1.657, p=0.002) and Kurtosis (HR=2.484, p<0.001) were independent predictors of OS and were confirmed in the validation cohort (p<0.048). Tumor burden and Kurtosis showed incremental predictive capacity allowing a good predictive model when combined with baseline S100B levels (C-index=0.720). Only S100B was predictive of treatment response (OR<=0.630, p<=0.022). Imaging biomarkers didn't predict treatment response.

CONCLUSION

We identified easily obtainable baseline clinical (S100B) and CT predictors (tumor burden and Kurtosis) of OS in patients with metastatic melanoma undergoing immunotherapy. However, imaging predictors didn't predict treatment response.

CLINICAL RELEVANCE/APPLICATION

Baseline S100B levels, baseline tumor burden and Kurtosis of the largest target lesions are independent survival predictors in patients with metastatic melanoma undergoing immunotherapy. Baseline S100B level are also predictive of response to immunotherapy.

SSQ06-06 Evaluating for Primary Malignancy in Patients with Solitary and Multiple Brain Lesions: the Diagnostic Value of CT Chest, Abdomen, and Pelvis

Thursday, Dec. 5 11:20AM - 11:30AM Room: S103AB

Participants
Richard K. Rothman, MD, West Haven, CT (*Presenter*) Nothing to Disclose
Jeffrey C. Weinreb, MD, New Haven, CT (*Abstract Co-Author*) Consultant, Bayer AG
William B. Zucconi, DO, Madison, CT (*Abstract Co-Author*) Nothing to Disclose
Ajay Malhotra, MD, Stamford, CT (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

richard.rothman@yale.edu

PURPOSE

Patients with newly discovered brain lesions on CT or MRI often undergo CT of the chest, abdomen, and pelvis in an effort to identify a primary cancer that may have metastasized to the brain. The aim of this study was to determine the frequency of finding a primary cancer on CT of the chest, abdomen, and/or pelvis in these patients.

METHOD AND MATERIALS

We evaluated how often a primary malignancy was diagnosed in the chest versus abdomen and pelvis portions of CT scans in patients with newly identified brain lesions. Multiple brain lesion characteristics were recorded, such as size, the presence of enhancement and hemorrhage as well as whether lesions were single or multiple.

RESULTS

Out of 287 consecutive cases over five years, the final diagnoses were 136 primary brain malignancies (47%), 91 metastatic malignancies (32%), and 60 benign entities (21%). Of the 91 metastatic malignancies, 68 were of lung primary (75%). Chest CT identified a primary malignancy in 65 of 287 total cases (23%), 62 of which were lung cancers. The abdomen and pelvis portion of the CT scans identified a primary malignancy in only 3 cases (1%). In 26 cases, where the brain lesion(s) did not enhance, only 1 was a metastasis.

CONCLUSION

In patients with newly discovered brain lesions on imaging, CT of the chest to identify a primary lung cancer is warranted in patients with enhancing brain lesions. Without signs/symptoms of abdominopelvic malignancy, CT of the abdomen/pelvis will rarely reveal a primary cancer that metastasized to the brain.

CLINICAL RELEVANCE/APPLICATION

Utilizing CTC in place of CTCAP would reduce healthcare costs and patient radiation dose in patients with new brain lesions found on imaging and without sign/symptoms of an abdominopelvic malignancy.

SSQ06-07 Prediction of Outcome in Anal Squamous Cell Carcinoma Using Radiomic Feature Analysis of Pre-

Treatment FDG PET-CT

Thursday, Dec. 5 11:30AM - 11:40AM Room: S103AB

Participants
Peter Brown, MBChB, BSc, Leeds, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Russell Frood, MBBCh, Leeds, United Kingdom (*Presenter*) Nothing to Disclose
Jim Zhong, Leeds, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Stuart Currie, FRCR,MD, Leeds, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Alexandra Gilbert, MBBS, MRCP, Leeds, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Ane L. Appelt, Leeds, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
David Sebag-Montefiore, MD, PhD, Leeds, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Andrew F. Scarsbrook, FRCR, York, United Kingdom (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Incidence of anal squamous cell carcinoma (ASCC) is increasing, with curative chemoradiotherapy (CRT) as the primary treatment of non-metastatic disease. A significant proportion of patients have loco-regional treatment failure (LRF), but rarely distant relapse. Accurate prognostication of progression free survival (PFS) would help personalisation of CRT regimens. The study aim was to evaluate novel imaging pre-treatment features, to prognosticate for PFS in ASCC.

METHOD AND MATERIALS

Consecutive patients with ASCC treated with curative intent at a large tertiary referral centre who underwent pre-treatment FDG-PET/CT were included. Radiomic feature extraction was performed using LIFEx software on baseline FDG-PET/CT. Outcome data (PFS) was collated from electronic patient records. Elastic net regularisation and feature selection was used for logistic regression model generation on a randomly selected training cohort and applied to a validation cohort using TRIPOD guidelines. ROC-AUC analysis was used to compare radiomic feature model performance with a regression model combining standard prognostic factors (age, sex, tumour and nodal stage).

RESULTS

189 patients were included in the study, with 102/145 in the training cohort and 30/44 in the validation cohort. PFS and median follow-up were 70.3% / 35.1 months and 68.2% / 37.9 months, respectively. GLCM Entropy (a measure of randomness of distribution of co-occurring pixel grey-levels), NGLDM Busyness (a measure of spatial frequency of changes in intensity between nearby voxels of different grey-level), minimum CT value (lowest HU within the lesion) and SMTV (a standardized version of MTV) were selected for inclusion in the prognostic model. AUC for elastic net model prediction in the validation cohort was 0.738, the AUC for standard prognostic factors was 0.602.

CONCLUSION

Radiomic features extracted from pre-treatment FDG-PET/CT in patients with ASCC may provide better PFS prognosis than conventional staging parameters. With external validation this might be useful to help personalise CRT regimens in the future.

CLINICAL RELEVANCE/APPLICATION

Radiomic feature analysis with FDG-PET/CT can be used in anal squamous cell carcinoma to predict outcomes, which could potentially be used to help personalise future chemoradiotherapy regimens.

SSQ06-08 Radiomics Analysis of Advanced Gastric Cancer: A More Accurate Method for Real-Time Assessment of Treatment Response to Neoadjuvant Chemotherapy

Thursday, Dec. 5 11:40AM - 11:50AM Room: S103AB

Participants
Qinmei Xu, MS,PhD, Nanjing, China (*Presenter*) Nothing to Disclose
Shangsheng Zhou, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Danyang Ren, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Xiuli Li, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Long Jiang Zhang, MD, PhD, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose
Guang Ming Lu, MD, PhD, Nanjing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

xqm@smail.nju.edu.cn

PURPOSE

To develop a computed tomography (CT) based radiomics method for diagnosis of pathological downstaging after each cycle of neoadjuvant chemotherapy (NAC) in advanced gastric cancer (AGC), evaluate its performance and compare with the clinical conventional RECIST assessment at CT imaging.

METHOD AND MATERIALS

This retrospective study include 247 AGC patients who received 1-4 cycles of NAC and followed by surgery. Ninety-two of them (37.2%) achieved pathological downstaging. We extracted 1231 features from post-NAC portal venous-phase CT scans for each patient, then made up 28 cross-combination radiomic models with 7 feature selection methods and 4 classifiers within a nested cross-validation (CV) structure. The optimal model was selected. Its performance was assessed with respect to its discrimination and compared with that of RECIST at CT imaging in two external validation cohorts, which included patients who received 1-2 cycles and 3-4 cycles of NAC, respectively.

RESULTS

The optimal radiomics model consisting of the feature selection method of wilcoxon and classifier of linearSVC achieved a mean AUC of 0.919 (the highest among the 28 machine-learning models). It used 92 features, including wavelet-LHL_glszm_GrayLevelNonUniformity, wavelet-LLL_glrlm_RunLengthNonUniformity, and wavelet-LHL_firstorder_TotalEnergy, the

weight of which ranked in the top 3. This model had a good diagnostic ability in both two external validation cohorts (AUC 0.927±0.093; AUC 0.884±0.102, respectively), which outperformed the RECIST method (NRI 39.5%, p<0.05; NRI 35.4%, p<0.05, respectively).

CONCLUSION

Contrast-enhanced CT based radiomics has an excellent ability of preoperative diagnosis and early detection of pathological downstaging, more sensitive and accurate than routine method, which may have significant clinical implications on real-time assessment of downstaging for AGC patients who were experiencing NAC.

CLINICAL RELEVANCE/APPLICATION

The effective radiomics model combining 85 radiomic features might turn into a noninvasive and convenient potential imaging biomarker of chemotherapy response, providing more accurate and timely evaluation to optimize and individualize the treatment.

SSQ06-09 Agreement between Prospective Local Evaluation and Retrospective Central Evaluation of Metastatic Colorectal Cancer by RECIST

Thursday, Dec. 5 11:50AM - 12:00PM Room: S103AB

Participants
Tugce Agirlar Trabzonlu, MD, Chicago, IL (*Presenter*) Grant, Siemens AG
Roozbeh Houshyar, MD, Orange, CA (*Abstract Co-Author*) Nothing to Disclose
Mohammad Helmy, MD, Anaheim, CA (*Abstract Co-Author*) Nothing to Disclose
Yuri Velichko, PhD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Cecil G. Wood III, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Vahid Yaghmai, MD, Orange, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

tugce.trabzonlu@northwestern.edu

PURPOSE

Response evaluation criteria in solid tumors (RECIST) measurements are commonly performed prospectively at the cancer centers in order to assess disease progression. However, data from clinical trial are also commonly assessed by a central review in retrospective fashion at the conclusion of trial. The purpose of our study was to assess concordance level between prospective and retrospective RECIST reporting performed by trained radiologists.

METHOD AND MATERIALS

The study was IRB approved. One hundred five CT studies in 39 patients with metastatic colorectal cancer were included. Radiologists reviewed all scans using RECIST guideline both prospectively and retrospectively. Prospective and retrospective studies were evaluated six weeks apart. The agreement in RECIST between prospective and retrospective assessment were evaluated.

RESULTS

In 34 of 39 (87.2%) patients and in 59 of 66 (89.4%) follow-up assessments, prospective and retrospective evaluation with different radiologists agreed on RECIST classification. In all patients with discordance, the radiologists selected at least 1 different target lesion in every patient. In patients with the same target lesion selected (n=7), prospective and retrospective RECIST agreement reached to 100%. When prospective and retrospective RECIST evaluation were performed by the same radiologist, agreement rate was slightly higher when compared to performance of two different radiologists (89.7% vs 87.2% of patients and 93.9% vs 89.4% of follow-up assessments (p>0.05). In the prospective and retrospective evaluation by the same radiologist, measurement variabilities resulted in RECIST discordance in 2 patients (5.1%).

CONCLUSION

If RECIST is strictly applied by blinded and trained radiologists, a strong agreement between prospective and retrospective evaluation can be observed. However, differences in target lesion selection and measurement variations may lead to differences in response assessment.

CLINICAL RELEVANCE/APPLICATION

If RECIST is strictly applied by blinded and trained radiologists, a strong agreement between prospective and retrospective evaluation can be observed. Therefore, prospective evaluation of response rate during the trial using RECIST may be a valid reflection of future evaluation by a central imaging core.

SSQ07

Gastrointestinal (Advanced MRI Techniques)

Thursday, Dec. 5 10:30AM - 12:00PM Room: S103CD

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Participants
Hersh Chandarana, MD, New York, NY (*Moderator*) Equipment support, Siemens AG; Software support, Siemens AG; ;
Kelly L. Cox, DO, Jacksonville, FL (*Moderator*) Nothing to Disclose
Michael A. Ohliger, MD,PhD, Burlingame, CA (*Moderator*) Travel support, General Electric Company; Speaker, General Electric Company

Sub-Events

SSQ07-01 Impact of Temporal Resolution and Motion Correction for Dynamic Contrast-Enhanced MR Imaging of the Liver Using an Accelerated Golden-Angle Radial Sequence

Thursday, Dec. 5 10:30AM - 10:40AM Room: S103CD

Participants
Rihab Mansour, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Alana Thibobeau-Antonacci, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Laurent Bilodeau, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Milena Cerny, MD, Montreal, QC (*Abstract Co-Author*) Nothing to Disclose
Guillaume Gilbert, PhD, Montreal, QC (*Abstract Co-Author*) Employee, Koninklijke Philips NV
An Tang, MD, Montreal, QC (*Abstract Co-Author*) Research Consultant, Imagia Cybernetics Inc Speaker, Siemens AG Speaker, Eli Lilly and Company
Samuel Kadoury, Montreal, QC (*Presenter*) Nothing to Disclose

PURPOSE

To evaluate the impact on image quality and quantitative dynamic contrast-enhanced (DCE)-MRI perfusion parameters when varying the number of respiratory motion states on DCE-MRI perfusion parameters using eXtraDimensional Golden-Angle Radial Sparse Parallel (XD-GRASP).

METHOD AND MATERIALS

This prospective study was approved by the institutional review board and consent was obtained from patients. Eleven patients, 6 men and 5 women (70 years ± 11 [standard deviation]), underwent DCE-MRI examinations on a 3.0 T MRI (Achieva TX, Philips Healthcare). T1 mapping was performed using the variable flip-angle method with fat-saturated cartesian 3D gradient-echo acquisitions in breath-hold. DCE acquisition was performed in free-breathing using a 3D stack-of-stars gradient-echo golden-angle radial acquisition. Contrast injection was performed 30 s after initiating the DCE acquisition. Nonparametric analysis was conducted on the time-intensity curves. Parametric analysis was performed using a dual-input single-compartment model. Comparison of signal-to-noise ratio (SNR), contrast-to-noise ratio (CNR) and perfusion parameters was made for XD-GRASP with different number of respiratory motion states.

RESULTS

A total of 22 HCCs (size: 11 - 52 mm) were evaluated. XD-GRASP reconstructed with increased motion states improves the SNR ($P < 0.05$) but reduces temporal resolution (0.04 volume/s vs 0.17 volume/s for one motion state) ($P < 0.05$). The peak enhancement ratio and normalized maximum intensity time ratio increased with decreasing number of motion states ($P < 0.001$) while the transfer constant from the portal venous plasma to the surrounding tissue significantly decreased ($P < 0.05$).

CONCLUSION

Peak enhancement ratio, normalized maximum intensity time ratio and transfer constant from the portal venous plasma to the surrounding tissue were sensitive to the number of motion states and to the temporal resolution. While a higher number of motion states improves SNR, the resulting lower temporal resolution can influence quantitative parameters that capture rapid signal changes.

CLINICAL RELEVANCE/APPLICATION

XD-GRASP can be used to perform quantitative perfusion measures for HCC response assessment, but the number of motion states may significantly alter some quantitative parameters.

SSQ07-02 Clinical Application of Amide Proton Transfer Imaging in the Liver: The Feasibility Study

Thursday, Dec. 5 10:40AM - 10:50AM Room: S103CD

Participants
Nieun Seo, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Yong Eun Chung, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Ha-Kyu Jeong, Suwon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

Jin-Young Choi, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Mi-Suk Park, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Myeong-Jin Kim, MD, PhD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Research grant, Bayer Pharma AG; Honoraium, Guerbet SA, GE healthcare, Philips, and Siemens Healthineers

For information about this presentation, contact:

neseo.radiology@gmail.com

PURPOSE

To investigate the feasibility of amide proton transfer (APT) magnetic resonance imaging (MRI) in the liver and to evaluate its ability to characterize focal liver lesions (FLL)

METHOD AND MATERIALS

A total of 85 patients with suspected FLLs who underwent APT imaging at 3T were included. APT imaging was obtained at single slice to include FLL through five breath holds with interleaved APT and B0 field map scans. APT signals in the background liver and FLL were analyzed with the asymmetric magnetization transfer ratio (MTRasym). Technical success rate of APT imaging was calculated. MTRasym values were compared between the background liver and FLL, and between different FLLs using paired sample t-test or Wilcoxon signed rank test.

RESULTS

Technical success rate of APT imaging in the liver was 69.4% (59/85), and the reason of failure was too large B0 inhomogeneity. The acquisition time of APT imaging was approximately 1 minute. Among 59 FLLs with analyzable APT images, MTRasym values of 27 patients with liver metastases and 23 patients with hepatocellular carcinomas (HCCs) were compared. MTRasym values of metastases and background liver were significantly different (0.13 ± 2.15% vs. -1.62 ± 2.12%, P = 0.001), while those values of HCCs and background liver were similar (-1.41 ± 3.68% vs. -1.18 ± 1.60%, P = 0.767). MTRasym values of metastases were significantly higher than those of liver metastases (P = 0.027).

CONCLUSION

APT imaging could have a role to differentiate metastasis from HCC, although approximately 30% of cases were failed to obtain acceptable APT images of the liver.

CLINICAL RELEVANCE/APPLICATION

APT imaging might be useful to characterize focal liver lesions, but further technical improvement is required to apply APT imaging in the human liver.

SSQ07-03 Evaluation of Liver MRE Analyzability Criteria Using a Simulation Method Based on Successively and Concentrically Decreasing the Size of Selected Regions-of-Interest: A Proof-of-Concept Study

Thursday, Dec. 5 10:50AM - 11:00AM Room: S103CD

Participants
Michael S. Middleton, MD,PhD, San Diego, CA (*Presenter*) Institutional research contract, Alexion Pharmaceuticals, Inc; Institutional research contract, AstraZeneca PLC; Institutional research contract, BioClinica, Inc; Institutional research contract, Biomedical Systems; Consultant, Bracco Group; Institutional research contract, Bristol-Myers Squibb Company; Institutional research contract, Enanta; Institutional research contract, Galmed Pharmaceuticals Ltd; Institutional consultant contract, F. Hoffmann-La Roche Ltd; Institutional research contract, General Electric Company; Institutional research contract, Gilead Sciences, Inc; Institutional research contract, Guerbet SA; Institutional research contract, ICON plc; Institutional research contract, Intercept Pharmaceuticals, Inc; Consultant, Kowa Company, Ltd; Consultant, MEDIAN Technologies; Consultant, IBM Corporation; Consultant, Novo Nordisk AS; Institutional research contract, Pfizer Inc; Stockholder, Pfizer Inc; Institutional research contract, Prosciento; Consultant, Quantitative Insights, Inc; Institutional research contract, F. Hoffmann-La Roche Ltd; Institutional research contract, Shire plc; Institutional research contract, Synageva; Institutional research contract, Siemens AG; Institutional research contract, VirtualScopics, Inc
Chetan Potu, La Jolla, CA (*Abstract Co-Author*) Nothing to Disclose
Walter Henderson, La Jolla, CA (*Abstract Co-Author*) Nothing to Disclose
Timoteo I. Delgado, BA, San Diego, CA (*Abstract Co-Author*) Nothing to Disclose
Chuhan Chung, MD, Foster City, CA (*Abstract Co-Author*) Employee, Gilead Sciences, Inc
Stephen Djedjos, MD, Foster City, CA (*Abstract Co-Author*) Employee, Gilead Sciences, Inc
Robert Myers, MD, Foster City, CA (*Abstract Co-Author*) Employee, Gilead Sciences, Inc
Richard L. Ehman, MD, Rochester, MN (*Abstract Co-Author*) CEO, Resoundant, Inc; Stockholder, Resoundant, Inc;
Claude B. Sirlin, MD, San Diego, CA (*Abstract Co-Author*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc

For information about this presentation, contact:

msm@ucsd.edu

PURPOSE

An objective method to determine the adequacy of liver magnetic resonance elastography (MRE) exams is to use a cutoff for total region-of-interest (ROI) size, usually either 500 or 700 pixels (Px) over four slices. However, little objective evidence supports either of these cutoffs. We performed a simulation study to evaluate how the mean, and the range of calculated liver stiffness values varies for these, and two higher cutoff values as we concentrically shrink total ROI size, for data from a multi-center drug development clinical trial of adults with nonalcoholic steatohepatitis (NCT02854605).

METHOD AND MATERIALS

Two-hundred and six MR exams were selected from the aforementioned clinical trial, based on availability of elastograms, and ROI size >= 4000 Px over four slices placed at clinical trial sites during the study. For each exam, stiffness values for all pixels were recorded. Stiffness values were calculated by randomly removing ten concentric Px at a time from the ROI edges, and repeating 100 times. For each simulation of 100 iterations, the stiffness ranges, at 500, 700, 2000, and 4000 Px were captured, and the medians were calculated. An absolute stiffness value difference was recorded for each of the four cutoffs, compared to the stiffness value reported using all pixels, and the means were calculated.

RESULTS

Average absolute differences in mean stiffness values across all simulations at the four cutoff values, compared to those obtained using all pixels, increased as cutoff values decreased (0.073, 0.148, 0.256, and 0.292 kPa for 4000, 2000, 700, and 500 Px, respectively). The median values of the the stiffness ranges across all simulations at the four cutoffs similarly increased as cutoff value decreased (0.014, 0.021, 0.038, 0.043 kPa at 4000, 2000, 700, and 500 Px, respectively).

CONCLUSION

At a proof-of-concept level, and subject to validation in other independent cohorts, this data supports that MRE liver stiffness analyzability cutoffs down to 500 Px over four slices are reasonable. For all four pixel cutoffs, the median values of the stiffness ranges, and the average absolute differences in mean liver stiffness compared to values obtained using all pixels, were small.

CLINICAL RELEVANCE/APPLICATION

These results suggest that MRE analyzability using a cutoff as low as 500 Px is likely to be acceptable for drug development clinical trials, and also for clinical care after further validation.

SSQ07-04 T1 Relaxation Times of the Liver and Spleen to Predict Significant Liver Fibrosis: Is There an Additional Value of Normalization to Blood Pool?

Thursday, Dec. 5 11:00AM - 11:10AM Room: S103CD

Participants
Verena Obmann, MD, Cleveland Heights, OH (*Abstract Co-Author*) Nothing to Disclose
Annalisa Berzigotti, Bern, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Lukas Ebner, MD, Bern, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Andreas Christe, Bern, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Adrian T. Huber, MD, Bern, Switzerland (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

adrian.huber@insel.ch

PURPOSE

To analyze liver and spleen native T1 relaxometry values to predict significant fibrosis and their additional value when normalized to the blood pool.

METHOD AND MATERIALS

156 patients without solid liver lesions, prior liver surgery or portal vein thrombosis on routine liver multidetector CT scans underwent liver MRI with gradient-echo based MR elastography (MRE) and Shortened Modified Look-Locker Inversion recovery (shMOLLI) based T1 relaxometry. T1 relaxation times were measured in the right liver lobe and in the spleen, as well as in the aorta and in the vena cava. MRE liver stiffness were compared with T1 relaxation times alone, as well as T1 relaxation times normalized to the blood pool in the vena cava and in the aorta. Pearson correlation, students t-test and receiver operation characteristics (ROC) analysis were used to investigate the usefulness of different T1 relaxometry values to predict significant liver fibrosis, using a cutoff value of 3.5kPa in MRE (corresponding to F2 or higher in histology).

RESULTS

Correlation between T1 relaxometry values and MRE liver stiffness was r=0.49-0.59 ($p<0.001$) for T1 of the liver and for T1 of the liver normalized to blood pool, while T1 of the spleen was less useful (r=0.11-0.17). Both normalized and not normalized T1 values of the liver allowed to significantly separate patients with significant liver fibrosis from those without significant liver fibrosis ($p<0.001$). In ROC-analysis, T1 relaxometry values normalized to the blood pool did not perform better than T1 values alone (Figure).

CONCLUSION

Native T1 relaxation times of the liver allowed to predict clinically significant liver fibrosis, while T1 relaxation times of the spleen were less useful. There was no additional value of liver and spleen native T1 relaxometry values to predict significant fibrosis when normalized to the blood pool.

CLINICAL RELEVANCE/APPLICATION

T1 relaxometry is acquired in 9 seconds per slice and may be installed on any MR scanner without the need for additional hardware. It allows to predict significant liver fibrosis without time-consuming image post-processing

SSQ07-05 New Radial Technique for the Calculation of T2 Relaxation Time in Liver MRI

Thursday, Dec. 5 11:10AM - 11:20AM Room: S103CD

Participants
Janio Szklaruk, MD, PhD, Houston, TX (*Presenter*) Nothing to Disclose
Jong Bum Son, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Jia Sun, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Bryce Starr, Durhan, NC (*Abstract Co-Author*) Nothing to Disclose
Priya R. Bhosale, MD, Bellaire, TX (*Abstract Co-Author*) Nothing to Disclose
Jingfei Ma, PhD, Houston, TX (*Abstract Co-Author*) Royalties, Siemens AG; Royalties, General Electric Company; Consultant, C4

Imaging

For information about this presentation, contact:

jszklaru@mdanderson.org

PURPOSE

The purpose is to investigate the clinical application of 2D radial TSE (2DRTSE) sequencing by evaluating the quantitative T2 relaxation time (msec) of liver lesions and the background liver parenchyma. We also evaluated image quality.

METHOD AND MATERIALS

MRI was performed at 3.0 T in this IRB-approved prospective study. The prototype 2D radial TSE sequence (2DRTSE) generated 22 echo axial images corresponding to 22 different TEs (ranging from 8.6 ms to 188.8 ms) with prospective acquisition correction for free-breathing patient scans. By placing an ROI on the automatically generated T2 map, 2 radiologists obtained relaxation times for various liver lesions and background liver. Radiologists scored image quality. Weighted linear kappa statistics and the Lin concordance correlation coefficient (CCC) were used to assess inter-reader agreement. The differences in paired T2RTs of the two readers were plotted against their mean values using Bland-Altman plots. Multiple lesions within the same patient were considered independently.The Kruskal-Wallis test was used to compare T2RTs among different lesion types.

RESULTS

19 patients were included in the study. There were 36 liver lesions: 2 cysts, 9 hemangiomas, 21 solid lesions, and 4 necrotic metastatic lesions. The solid lesions were 12 metastases, 8 HCC, and 1 FNH.The mean calculated T2RT value for solid lesions (81.5 ms) was significantly lower than that for hemangiomas (153.9 ms; P = 0.0024).The Wilcoxon rank-sum test revealed that the mean calculated T2RT for liver cysts (285.7 ms) was significantly higher than solid lesions (81.5 ms; P = 0.025). For the 2 radiologists, the CCC was 0.996 (95% confidence interval 0.9914-0.9978) for the calculated T2 of each liver lesion, indicating substantial agreement. The mean calculated T2RT for the background liver was 42.2 ms. The Bland-Altman plot of the liver T2RT data showed 95% agreement between readers, allowing for a range of +10 to -13.3 ms. . Qualitative analysis of liver margins revealed good liver margin visibility in 100% of the evaluated slices

CONCLUSION

2D radial TSE sequencing is capable of providing good T2W images and a quantitative T2RT map. The quantitative T2 map was useful for the characterization of liver lesions.

CLINICAL RELEVANCE/APPLICATION

2D radial TSE sequence may supplant current T2WI acquisition. The value of lesion detection for T2-weighted imaging will be enhanced by the addition of quantitative T2RTs.

SSQ07-06 Respiratory Motion Artifacts in Gadoterate- and Gadoxetate-Enhanced Dynamic Phase Liver MRI After Intensified and Standard Pre-Scan Preparation: A Bi-Institutional Analysis

Thursday, Dec. 5 11:20AM - 11:30AM Room: S103CD

Participants
Florian Siedek, MD, Stanford, CA (*Presenter*) Nothing to Disclose
Christian Wybranski, MD, Magdeburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Robert Damm, Magdeburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Angelos Gazis, Frankfurt am Main, Germany (*Abstract Co-Author*) Nothing to Disclose
Ortrud Kosiek, Magdeburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Stefan Haneder, MD, Cologne, Germany (*Abstract Co-Author*) Nothing to Disclose
Thorsten Persigehl, MD, Koeln, Germany (*Abstract Co-Author*) Nothing to Disclose
Susanne Steinhauser, Cologne, Germany (*Abstract Co-Author*) Nothing to Disclose
MacIej Pech, Berlin, Germany (*Abstract Co-Author*) Nothing to Disclose
Frank Fischbach, PhD, Magdeburg, Germany (*Abstract Co-Author*) Nothing to Disclose
Katharina Fischbach, Magdeburg, Germany (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

f.siedek@gmail.com

PURPOSE

Gadoxetate disodium induced transient severe arterial phase respiratory motion (TSM) substantially degrades image quality in liver dynamic contrast-enhanced MRI (DCE-MRI). Extent of liver DCE-MRI procedural information and explanation and/or training of breath-hold commands in standard pre-scan patient preparation (SPPP) might vary between institutions due to missing standardization, contributing to the occurence of gadoxetate-related TSM. This bi-institutional study investigates the effect of intensified pre-scan patient preparation (IPPP; SPPP + custom-made educational material about liver DCE-MRI + standardized breath-hold training) on gadoxetate-related TSM.

METHOD AND MATERIALS

At site A and B, 50 (site A) and 58 (site B) patients received IPPP and 50 (site A) and 52 (site B) patients received SPPP prior to gadoxetate-enhanced liver DCE-MRI. As control, the effect of IPPP and SPPP was crosschecked in each 101 patients who received gadoterate-enhanced liver DCE-MRI (site B). Respiratory motion (RM) was scored in dynamic phase images using a Likert-scale (1 [none] - 5 [non-diagnostic]) independently by 5 (site A) and 2 (site B) blinded readers.

RESULTS

In the gadoxetate group, IPPP neither significantly mitigated TSM which was observed in 19% of patients (p=0.366) nor RM in any dynamic phase of patients without TSM (all p>0.072). In the gadoterate group, however, IPPP significantly mitigated RM in all dynamic phases (all p<0.031) compared to SPPP. The inter-reader agreement for grading of RM artifacts was excellent in pre-contrast and all dynamic phase images with all intra-class correlation coefficients (ICCs) >0.92.

CONCLUSION

IPPP failed to reduce gadoxetate-related TSM supporting the hypothesis that gadoxetate disodium acts as a chemo-toxic trigger that evokes breath-hold difficulty which cannot be willingly suppressed or attenuated by education and training. Interestingly, IPPP also did not significantly mitigate RM in any dynamic phase in the non-TSM subgroup of patients who received gadoxetate disodium whereas IPPP very effectively reduced RM in all dynamic phases in the non-TSM subgroup of patients who received gadoterate meglumine. This implies that gadoxetate-related breath-hold difficulty does not only affect the TSM subgroup of patients or exclusively the arterial phase as previously proposed but rather all dynamic phases, albeit to a much lesser extent.

CLINICAL RELEVANCE/APPLICATION

Intensified pre-scan patient preparation seems to be a very effective and cost-neutral strategy to reduce respiratory motion in liver DCE-MRI employing extracellular contrast agents.

SSQ07-07 Clinical Evaluation of Diffusion-Weighted MRI based Virtual Elastography for the Assessment of Liver Fibrosis

Thursday, Dec. 5 11:30AM - 11:40AM Room: S103CD

Participants
Marie-Luise Kromrey, MD, Greifswald, Germany (*Presenter*) Nothing to Disclose
Denis J. Le Bihan, MD, PhD, Gif-Sur-Yvette, France (*Abstract Co-Author*) Research Consultant, Olea Medical
Shintaro Ichikawa, MD, PhD, Chuo, Japan (*Abstract Co-Author*) Nothing to Disclose
Utaroh Motosugi, MD, Chuo, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

marie-luise.kromrey@uni-greifswald.de

PURPOSE

To compare diffusion-weighted MRI (dMRI) based elastography and standard MR elastography (MRE) for the assessment of liver fibrosis in a clinical setting.

METHOD AND MATERIALS

In an IRB approved retrospective study 99 patients underwent 2D MRE and dMRI on a 3T scanner. 25 patients had to be excluded due to insufficient image quality resulting in a final study population of 74 patients (45 men, mean age 68.1±8.7 years). Shear modulus measured by MRE (µMRE) was obtained in each subject by placing liver ROIs on the stiffness maps by two independent readers. Shifted apparent diffusion coefficient (sADC) was calculated from dMRI acquired without mechanical vibration with b=200 and 1500 s/mm2. dMRI-based virtual shear modulus (µDiff) was then derived from sADC as previously shown. MRI-based liver fibrosis stages were estimated from µMRE and µDiff values using optimal cutoff values according to METAVIR score (F0-F4). Statistical analysis was undertaken using Bland-Altman plots and Bayesian prediction analysis.

RESULTS

Inter-reader agreement was very high (mean difference: 0.04±0.43 kPa; -0.03±0.60 kPa for µDiff and µMRE, respectively, not significant). Correlation between sADC and µDiff was highly significant (r2=0.81, p=6 10-24) with µMRE and µDiff values showing agreement for each patient (mean difference: -0.02±0.88 kPa, not significant). Complete agreement in fibrosis staging was obtained in 55% of the patients and good agreement (ΔF=±1) in 36%. Categorizing fibrosis into "insignificant" (F0/F1) and "significant" (F2-F4) agreement between the two methods reached 85% (63/74, Kappa=0.85).

CONCLUSION

dMRI-based virtual shear modulus values and resulting fibrosis stages showed high agreement with those by MRE. dMRI holds great potential for the evaluation of liver fibrosis non-invasively without the need for any mechanical vibration setup as an alternative to MRE and biopsy.

CLINICAL RELEVANCE/APPLICATION

Diffusion MRI based virtual elastography holds great potential as an alternative to MRE to evaluate liver fibrosis non-invasively without the need for any mechanical vibration setup.

SSQ07-08 Diagnostic Accuracy of Liver Imaging Reporting and Data System (LI-RADS) for HCC in Non-Cirrhotic Patients with Chronic Hepatitis

Thursday, Dec. 5 11:40AM - 11:50AM Room: S103CD

Participants
Yu Han, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Jingbiao Chen, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Linqi Zhang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Sichi Kuang, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Sidong Xie, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Claude B. Sirlin, MD, San Diego, CA (*Abstract Co-Author*) Research Grant, Gilead Sciences, Inc; Research Grant, General Electric Company; Research Grant, Siemens AG; Research Grant, Bayer AG; Research Grant, Koninklijke Philips NV; Consultant, AMRA AB; Consultant, Fulcrum; Consultant, IBM Corporation; Consultant, Exact Sciences Corporation; Consultant, Boehringer Ingelheim GmbH; Consultant, Arterys Inc; Consultant, Epigenomics; Author, Medscape, LLC; Lab service agreement, Gilead Sciences, Inc; Lab service agreement, ICON plc; Lab service agreement, Intercept Pharmaceuticals, Inc; Lab service agreement, Shire plc; Lab service agreement, Enanta; Lab service agreement, Takeda Pharmaceutical Company Limited; Lab service agreement, Alexion Pharmaceuticals, Inc; Lab service agreement, NuSirt Biopharma, Inc
Jin Wang, MD, Guangzhou, China (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

ysshrine@163.com

PURPOSE

The use of the Liver Imaging Reporting and Data System (LI-RADS) has not been validated in non-cirrhotic patients with chronic hepatitis. This study examines the accuracy of LI-RADS v2018 for hepatocellular carcinoma (HCC) using contrast-enhanced MR imaging in non-cirrhotic patients with chronic hepatitis.

METHOD AND MATERIALS

This retrospective single-center study was approved by our IRB with waived informed consent requirement. Between 2016 and 2018, 160 patients with chronic hepatitis and histology-proven absence of cirrhosis underwent contrast-enhanced MR imaging. In consensus, two radiologists retrospectively assigned LI-RADS v2018 categories to each of a total of 161 observations. The reference standard was histology for malignant lesions and clinical and radiological follow-up for at least one year for benign lesions. Sensitivity, specificity, accuracy, positive predictive value (PPV), negative predictive value (NPV), and false positive rate (FPR) of LR-5 for the diagnosis of HCC were estimated.

RESULTS

The final diagnoses and LI-RADS categories of each observation are summarized in Table. Overall, 71 (44.1%) lesions were HCCs, 23 (14.3%) were non-HCC malignancies, and 67 (41.6%) were benign. LI-RADS categories of LR-1, LR-2, LR-3, LR-4, LR-5, and LR-M were assigned in 6 (3.7%), 43 (26.7%), 15 (9.3%), 12 (7.5%), 70 (43.5%), and 15 (9.3%) observations, respectively. Among LR-5s, 64 (91.4%) were HCCs and 69 (98.6%) were malignant. The sensitivity, specificity, accuracy, PPV, NPV, and FPR of LR-5 for HCC were 90.1%, 93.3%, 91.2%, 91.4%, 92.3%, and 6.7%, respectively. Among LR-Ms, 4 (27%) were HCCs and 15 (100%) were malignant.

CONCLUSION

This single-center, retrospective study suggests that LIRADS v2018 using contrast-enhanced MR imaging has high accuracy for HCC in non-cirrhotic HCC patients with chronic hepatitis. Multicentric, prospective studies are needed to validate this preliminary finding.

CLINICAL RELEVANCE/APPLICATION

This single-center, retrospective study suggests that LI-RADS v2018 using contrast-enhanced MRI may be valid in non-cirrhotic patients with chronic hepatitis. Further studies are warranted.

Printed on: 10/29/20

SSQ08

Gastrointestinal (Advanced CT Technique)

Thursday, Dec. 5 10:30AM - 12:00PM Room: S102CD

CT GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Vahid Yaghmai, MD, Orange, CA (*Moderator*) Nothing to Disclose
Meghan G. Lubner, MD, Madison, WI (*Moderator*) Grant, Koninklijke Philips NV; Grant, Johnson & Johnson;
William C. Small, MD, PhD, Atlanta, GA (*Moderator*) Nothing to Disclose

Sub-Events

SSQ08-01 Adaptive Statistical Iterative Reconstruction Technique (ASIR-V) with Different Weights on Spectral CT Using Conventional 120kVp Scan: A Phantom Study

Thursday, Dec. 5 10:30AM - 10:40AM Room: S102CD

Participants
Yao Z. Peng, Beijing , China (*Presenter*) Nothing to Disclose

PURPOSE

To explore image quality of spectral CT using conventional 120kVp scan under the different weight of ASIR-V by using abdominal model.

METHOD AND MATERIALS

The abdominal model (Body rings)was scanned by GE Revolution CT using conventional 120kVp scan. Images were reconstructed using 20% weight to 80% weight (10%-step) of ASIR-V. The CT value, SD and CNR of different tissues(liver and erector spinae)were measured. Anova test and regression analysis were used to compare the different tissues of noise values (SD) and CNR weights of ASIR-V. The post-processing images were evaluated by two radiologists on a 4-point scale using a double-blinded method

RESULTS

With increasing of ASIR-V weight, the noise values of 7 groups generally exhibited a decreasing trend. By regression analysis, the linear regression equation of ASIR-V weight and image noise was y = -0.84x +11.321(x=ASIR-V weight y =noise),),R2 =0.977 F =832.187 P=0.000.With increasing of ASIR-V, the CNR of 7 groups generally exhibited an increasing trend. By regression analysis, the linear regression equation of ASIR-V weight and CNR was y = 0.98x + 3.425 (x = ASIR-V weight y = contrast noise ratio),R2=0.891 F =163.690, P =0.000. There was no significant difference in 30% and 40% weight of ASIR-V between the seven groups(P>0.01), but 30% and 40% weight of ASIR-V were the best in the subjective scores. There was a significant difference in the subjective scores between the other groups (P<0.01).

CONCLUSION

Image noise reduces and image quality improves as ASIR-V weight increases ina linear relationship. At 60% weight of ASIR-V,the image noise was substantially reduced and the subject score was the best. At 70% and 80% weight of ASIR-V,the image noise was substantially reduced and the subject score was poor.

CLINICAL RELEVANCE/APPLICATION

When using spectral CT using conventional 120kVp scan for liver scanning, the image quality can be improved by increasing the weight of ASIR-V to an appropriate value for better display of anatomies

SSQ08-02 Correlation between Hepatic Fatty Infiltration Degree and CT Number Measurement at Different Tube Voltages Using Animal Model

Thursday, Dec. 5 10:40AM - 10:50AM Room: S102CD

Participants
Ma Guangming, MMed, Xianyang City, China (*Presenter*) Nothing to Disclose
Furong Bai, Xianyang, China (*Abstract Co-Author*) Nothing to Disclose
Haifeng Duan, Xianyang City, China (*Abstract Co-Author*) Nothing to Disclose
Jin Chenwang, MS, Xi'an , China (*Abstract Co-Author*) Nothing to Disclose
Chenwang Jin, Xi'an, China (*Abstract Co-Author*) Nothing to Disclose
Chuangbo Yang, MMed, Xianyang City, China (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To investigate the correlation between the hepatic fatty infiltration degree and CT number measurement at different tube voltages (kVp).

METHOD AND MATERIALS

28 healthy SD rats weighing 200g-300g were used for the study. After 2 weeks of adaptive feeding, rats were divided into two groups: normal control group (n=5 with normal diet); experimental group (n=23 with high fat diet). After 4, 6 and 8 weeks, 8, 8 and 7 rats in the experimental group and 1, 1 and 3 rats from the control group, respectively underwent CT scans with 80kVp, 100kVp, 120kVp and 140kVp tube voltage. Rats were sacrificed after the CT scans to obtain liver specimens. CT number was measured on the conventional CT images of all tube voltages. Correlation between CT number measurement and pathologic findings was obtained.

RESULTS

There were 8, 11 and 9 normal, mild, moderate fatty liver rats based on pathology. The CT numbers for these 3 groups of rats were 69.48±1.12HU, 68.12±1.23HU and 66.57±1.08HU at 80kVp; 69.81±0.82HU, 68.56±1.72HU and 66.64±1.31HU at 100kVp; 69.24±1.42HU, 67.78±1.68HU and 65.92±1.50HU at 120kVp; and 68.58±1.63HU, 66.90±1.69HU and 64.82±1.47HU at 140kVp. The CT numbers at all tube voltages and pathology results were all negatively correlated with r values of -0.73, -0.71 -0.71 and -0.71.

CONCLUSION

CT number measurements at all 4 tube voltages (80, 100, 120 and 140kVp) all have good and similar correlation with pathologic findings for fatty infiltration degree, and changing tube voltage settings may not change the ability to differentiate normal and fatty liver tissues.

CLINICAL RELEVANCE/APPLICATION

CT number measurements at all 4 tube voltages (80, 100, 120 and 140kVp) all have good and similar correlation with pathologic findings for fatty infiltration degree, and changing tube voltage settings may not change the ability to differentiate normal and fatty liver tissues,it has a certain value in clinic fatty liver patients.

SSQ08-04 Automated Organ Segmentation Using Deep Learning with Window Setting Optimization

Thursday, Dec. 5 11:00AM - 11:10AM Room: S102CD

Participants
Myeongchan Kim, MD, Boston, MA (*Presenter*) Nothing to Disclose
Hyunkwang Lee, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Poornima Ramaraj, MS, Boston, MA (*Abstract Co-Author*) Nothing to Disclose
Kyoung Doo Song, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Synho Do, PhD, Boston, MA (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Window display settings is a key feature of clinical CT interpretation. A Window setting optimization (WSO) module can be combined with any deep convolutional neural network to automatically find the optimal window range in CT images. In this study, we aim to find the optimal window setting values for segmentation of four different organs and to improve the performance of the segmentation models.

METHOD AND MATERIALS

We collected whole-body CT scans (both contrast & non-contrast axial series) of 21 patients. We randomly selected 33 CT series for training and 6 for testing. Manual segmentation was done for four organs (lungs, liver, spleen, and kidneys) on the CT scans by a board-certified radiologist. We only included the CT slices that had at least one pixel of each organ for experiments. For this segmentation, we developed a deep convolutional neural network model with a WSO module, comprised of a 1x1 convolutional layer and an activation function. We trained the model with a WSO module and obtained an optimal windowing level and width through learning. To explore the effect of WSO module, we trained segmentation models with two types of WSO using ReLU and sigmoid activation functions and compared against model without a WSO module.

RESULTS

For a model without a WSO module, the mean dice scores of kidneys, spleen, liver, and lungs were 0.737, 0.926, 0.947, and 0.971, respectively. For a model with a sigmoid type of WSO module, the mean dice scores of kidneys, spleen, liver, and lungs were 0.758, 0.926, 0.944, and 0.969, respectively, and for a model with a ReLu type of WSO module, the mean dice scores were 0.778, 0.953, 0.974, and 0.947, respectively. Optimized window values (level, width) of kidneys, spleen, liver, and lungs with the sigmoid activation function were (-45, 454), (-37, 371), (-35, 359), and (-188, 2177), respectively. In case of using the ReLU activation function, values were (39, 388), (39, 388), (38, 375), and (43, 429) for kidneys, spleen, liver, and lungs, respectively.

CONCLUSION

We developed deep learning models for segmentation of 4 organs (lungs, liver, spleen, and kidneys) and improved performance with a WSO module.

CLINICAL RELEVANCE/APPLICATION

WSO modules can improve AI applications, which are convolutional neural networks, and can give readers an optimized window setting for target organs.

SSQ08-05 Quantitative and Qualitative Evaluation of Imaging Quality of Hepatic Multiphase CT with Four Different Image Reconstruction Techniques including FBP, Hybrid IR, MBIR, and DLR

Thursday, Dec. 5 11:10AM - 11:20AM Room: S102CD

Participants
Haruomi Yamaguchi, MD, Hidaka, Japan (*Presenter*) Nothing to Disclose
Eriko Maeda, MD, Tokyo, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroyuki Morisaka, MD, Hidaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Katsuhiro Sano, MD,PhD, Hidaka, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomoaki Ichikawa, MD, PhD, Hidaka, Japan (*Abstract Co-Author*) Nothing to Disclose

Kenji Ino, PhD, Bunkyo-Ku, Japan (*Abstract Co-Author*) Nothing to Disclose
So Tsushima, Otawara, Japan (*Abstract Co-Author*) Employee, Canon Medical Systems Corporation
Jiro Sato, MD, Bunkyo, Japan (*Abstract Co-Author*) Nothing to Disclose
Osamu Abe, MD, PhD, Itabashi-ku, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

yamaguchi.haruomi@gmail.com

PURPOSE

The purpose of this study was to evaluate the imaging quality of multiphasic hepatic CT images with four image reconstruction techniques.

METHOD AND MATERIALS

Multiphasic hepatic CT imaging in 30 patients were performed with a state-of-the-art ultra-high resolution CT scanner (Aquilion Precision; Canon Medical Systems, Otawara, Fukushima, Japan). High resolution mode (1024x1024 matrix, 0.25-mm section thickness) was employed for the CT imaging. All images were reconstructed with a combination of 512x512 matrix and 5-mm section thickness using the four image reconstruction techniques (filtered back projection (FBP), Hybrid Iterative Reconstruction (IR) (AIDR 3D), Model based IR(MBIR)(FIRST) and deep learning reconstruction(DLR)(AiCE). CT measurements were performed in the aorta (Ao) on hepatic arterial-dominant phase (HAP), in the portal vein (PV) and hepatic parenchyma (HP) on portal venous phase (PVP), and in the inferior vena cava (IVC) and HP on delayed phase (DP) images. The standard deviation (SD) of the psoas muscle as image noise was also measured on the images. All images were qualitatively assessed in terms of sharpness, granularity, and overall quality of the images in 4 -point grading scale (1-4; none, poor, good, excellent).

RESULTS

There were no significant differences in the mean CT values of the all organs on all phase images among the four different image reconstruction techniques. The mean SD on each phase images were same with each image reconstruction technique and they were 15.6 with FBP, 9.4 with Hybrid IR, 8.0 with MBIR, and 8.1 with DLR. The mean SD of all organs on the all phase images with FBP were higher than those of Hybrid IR, MBIR, and DLR. The all values with MBIR and DLR were lower than those with Hybrid IR. There were no significant differences in the all values between MBIR and DLR. The mean scores of sharpness, granularity, and overall quality of the images with DLR (3.9, 3.9, 3.9) were better than those with FBP (3.6, 3.5, 3.5), Hybrid IR (3.6, 3.6, 3.7), and MBIR (3.5, 3.5, 3.6). All these scores with MBIR were worse than those with Hybrid IR and DLR.

CONCLUSION

Based on the quantitative and the qualitative analyses, DLR was the most appropriate image reconstruction technique for multiphasic hepatic CT images obtained with the high resolution acquisition.

CLINICAL RELEVANCE/APPLICATION

It is possible to reduce further imaging noise in MBIR and DLR in comparison to FBP and Hybrid IR.

SSQ08-06 Evaluation of Malignant Liver Lesions Post Conventional Transarterial Chemoembolization: Intraprocedural Robotic Cone Beam CT (IP-CBCT) versus Multidetector CT (MDCT)

Thursday, Dec. 5 11:20AM - 11:30AM Room: S102CD

Participants
Thomas J. Vogl, MD, PhD, Frankfurt , Germany (*Abstract Co-Author*) Nothing to Disclose
Leona Alizadeh, Frankfurt, Germany (*Abstract Co-Author*) Nothing to Disclose
Nour-eldin A. Nour-Eldin, MD,PhD, Frankfurt am Main, Germany (*Abstract Co-Author*) Nothing to Disclose
Nagy N. Naguib, MD, MSc, Frankurt, Germany (*Abstract Co-Author*) Nothing to Disclose
Ahmed I. Ahmed, MBCHB, Assiut, Egypt (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

T.Vogl@em.uni-frankfurt.de

PURPOSE

To assess the latest technology intraprocedural robotic cone beam CT (IP-CBCT) versus postprocedural most recent multi-detector CT (MDCT) for volume imaging after conventional transarterial chemoembolization (cTACE) regarding diagnostic image quality in patients with liver lesions and tumor enhancement by ethiodized oil (Lipiodol).

METHOD AND MATERIALS

114 patients (63 females / 51 males) treated with 126 cTACE procedures underwent postinterventional Lipiodol-enhanced robotic IP-CBCT (4s, 220°, 366 images, scan length 17.5 cm) and 4 to 6 hours later native MDCT (120 kV, 76 mAs, 273 images, scan length 22.6 cm). 18 patients were treated for HCC, 96 patients for hepatic metastases of different primaries. Retrospectively, number and size of lesions and Lipiodol enhancement were evaluated and compared with the pre-interventional MRI. Image qualilty (IQ) was qualitatively evaluated in consensus with two experienced radiologists using a Likert scale (0-4).

RESULTS

For IP-CBCT significantly superior qualitative IQ scores of 3.1±0.7 were received for lesion delineation vs. 2.4±0.9 for MDCT ($p<0.05$). For general IQ IP-CBCT was evaluated with 3.0±0.6 vs. 3.1±0.4 for MDCT ($p>0.05$). Lipiodol-enhanced lesion volume correlated in 95.5% with the MRI in IP-CBCT vs. 78.33% in MDCT ($p<0.05$) due to a washout phenomenon. Complete washout was observed after a mean of 3.2h for 14% of patients (n=16). The MDCT provided no additional diagnostic information on non-target Lipiodol accumulation or other new damage.

CONCLUSION

Post-Lipiodol CBCT allows sufficient diagnostic image quality and precise information on target and non-target embolization, while enabling the radiologist to immediately adjust the therapy or react to complications. A prospective randomized trial is recommended

and planned.

CLINICAL RELEVANCE/APPLICATION

Post Lipiodol CBCT results in improved diagnostic and therapeutic information in TACE patients with malignant liver lesions.

SSQ08-07 Delayed Bolus Trigger Timing at CT Correlates with Reduced Ejection Fraction and Suboptimal Early Portovenous Contrast Phase

Thursday, Dec. 5 11:30AM - 11:40AM Room: S102CD

Participants
Corey T. Jensen, MD, Houston, TX (*Presenter*) Nothing to Disclose
Rahul G. Khetan, BS, Cypress, TX (*Abstract Co-Author*) Nothing to Disclose
Sanaz Javadi, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Saamir A. Hassan, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Ajaykumar C. Morani, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Marshall J. Adkins, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Jia Sun, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Xinming Liu, PhD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Nicolaus A. Wagner-Bartak, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

cjensen@mdanderson.org

PURPOSE

To assess whether the delayed time to Hounsfield unit trigger during bolus-tracking for CT correlates with reduced heart function on echocardiography and suboptimal portovenous contrast timing in the abdomen.

METHOD AND MATERIALS

The health record was searched for patients who underwent portovenous CT evaluation of the abdomen using bolus-tracking and who were also evaluated by echocardiography within 2 weeks of CT. Patients were excluded if there was an abnormal contrast injection curve related to poor IV access. The time of bolus trigger at 100 Hounsfield unit in the abdominal aorta at the celiac axis, patient age, and the ejection fraction from echocardiography were recorded. Two radiologists carried out consensus scoring of the liver contrast phase in each examination with a 5 point Likert score, 5 representing an optimal portovenous phase with proper contrast in the hepatic veins. Simple linear regression (univariate) was used to test for linear associations with bolus trigger time.

RESULTS

116 patients with a mean age of 60 ± 14 years fulfilled study criteria. The mean bolus trigger time was 18 ± 6 seconds (Range: 6-36 seconds) and the mean ejection fraction was 52 ± 12% (Range: 20-69%). A longer time to bolus trigger had a significant linear association with lower ejection fraction (P=0.020), lower hepatic contrast score (P=0.007) and older age (P=0.009).

CONCLUSION

Delayed time to Hounsfield unit trigger during routine bolus-tracking for CT can indicate reduced heart function and bolus-tracking often does not adequately adjust to provide an optimal portovenous contrast phase in the abdomen in the setting of reduced heart function.

CLINICAL RELEVANCE/APPLICATION

Bolus-tracking can provide data to aid in the diagnosis of reduced heart function; tailored protocols should be made for patients with suspected cardiac dysfunction to ensure that proper contrast phases are obtained in the abdomen.

SSQ08-08 Pancreatic CT Imaging With an Ultra-High Resolution CT Scanner and a New Denoising Reconstruction Algorism Using Deep Learning Technology: Intraindividual Comparative Study with Conventional CT Imaging

Thursday, Dec. 5 11:40AM - 11:50AM Room: S102CD

Participants
Hiromitsu Onishi, MD, Suita, Japan (*Presenter*) Research Grant, Canon Medical Systems Corporation
Masatoshi Hori, MD, Muko, Japan (*Abstract Co-Author*) Nothing to Disclose
Atsushi Nakamoto, MD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Mitsuaki Tatsumi, MD, PhD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Hideyuki Fukui, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Noriyuki Tomiyama, MD,PhD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Takashi Ota, MD,PhD, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazuya Ogawa, Suita, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the image quality of pancreatic CT imaging with an ultra-high resolution (UHR) CT scanner and a new denoising reconstruction algorism using deep learning technology compared with conventional CT imaging.

METHOD AND MATERIALS

Twenty consecutive patients with cystic pancreatic lesions, who underwent follow-up CT examinations with both a UHR CT scanner and a conventional CT scanner, constituted the study population. High resolution CT images with a matrix of 1024 x 1024 and a thickness of 0.25 mm were reconstructed with deep learning reconstruction algorism at the UHR CT scanner. Conventional CT images were reconstructed with a matrix of 512 x 512 and a thickness of 0.5 mm using a hybrid iterative reconstruction algorism. Image noise (standard deviation of CT values) and contrast-to-noise ratio (CNR) were measured and compared between the two CT image sets by using the paired t-test. Subjective image noise, sharpness of structural contour, delineation of the main

pancreatic ducts and cystic lesions, and overall image quality were assessed using a 5-point scale and compared by using the Wilcoxon signed rank test.

RESULTS

Image noise at UHR CT (9.4 ± 1.6) was significantly lower than that at conventional CT (13.0 ± 4.7, P < .01). CNR at UHR CT (12.7 ± 3.7) was significantly higher than that at conventional CT (8.8 ± 3.0, P < .01). Subjective image noise at UHR CT was lower than that at conventional CT images (P < .01). Sharpness, delineation of the main pancreatic duct, and overall image quality at UHR CT were significantly superior to those at conventional CT (P < .01, P < .05, P < .01, respectively). Delineation of the cystic lesions at UHR CT were also superior to those at conventional CT, although the difference did not reach statistical significance (P = .1).

CONCLUSION

Combination of a UHR CT scanner and a denoising reconstruction algorism using deep learning technology can provide high quality pancreatic CT images with less image noise and higher spatial resolution and improve the delineation of anatomical structures compared with conventional CT imaging technique.

CLINICAL RELEVANCE/APPLICATION

Ultra-high resolution CT enhanced by deep learning-based denoising reconstruction algorism may contribute to a precise evaluation of the pancreatic neoplasms due to its excellent image quality.

SSQ08-09 Determining the Use of Water Oral Contrast Based on Visceral Fat Index and Body Mass Index for CT Abdomen Pelvis Exams in the Outpatient Oncology Setting

Thursday, Dec. 5 11:50AM - 12:00PM Room: S102CD

Participants
George M. Cyriac, MD, Tampa, FL (*Presenter*) Nothing to Disclose
Kerry L. Thomas, MD, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose
Trevor A. Rose, MD, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose
Nainesh Parikh, MD, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose
Jin Qi, MD, Tian Jin, China (*Abstract Co-Author*) Nothing to Disclose
Mahmoud Abdalah, PhD, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose
Daniel Barnebee, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose
Daniel K. Jeong, MD, Tampa, FL (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

Assess effect of visceral fat in the CT evaluation of bowel and peritoneum with oral water versus positive density oral contrast in the outpatient oncology setting.

METHOD AND MATERIALS

100 consecutive subjects (54 males median age 64±14 years) had outpatient oncologic follow up CT abdomen pelvis exams with water used as oral contrast and available prior CT with gastrografin/barium. 500ml oral water was given 30 minutes prior to each outpatient CT scan as part of a department patient quality improvement initiative. CT exams were retrospectively evaluated and visceral fat area was segmented and thresholded (-274 to -49HU), at axial L2-3 level using a custom MATLAB (The Mathworks, Natick, MA) script, and divided by body surface area to provide visceral fat index (VFI). Bowel visualization adequacy was scored on a Likert scale (1-4) based on prior research. Confidence in ruling out peritoneal metastases and abscess were each scored on a Likert scale (1-3). Patient satisfaction surveys were obtained rating exam and wait time satisfaction on a Likert scale (1-10). Univariate receiver operating curve analysis was performed on VFI and body mass index (BMI) to predict excellent bowel visualization (Likert 1) and definitive confidence in ruling out peritoneal metastases and abscess (Likert 1). Mann Whitney U test was used to compare continuous variables, and Pearson correlation coefficient was used for correlation.

RESULTS

CT water oral contrast bowel visualization scores:1 (n=83), 2 (n=14), 3 (n=3), 4(n=0). CTs scored 1 had higher VFI 68±36 cm/m2 than CTs scored >=2; 17±16 cm/m2, p<.00001 and higher BMI 30±7 vs. 23±2 respectively p<.00001. Higher VFI was predictive of (Likert 1) excellent bowel visualization with AUC 0.91 (95%CI 0.84-0.98) p<0.001, while higher BMI had AUC 0.89 (95%CI 0.83-0.96) p<0.001. VFI threshold >= 23.76 cm/m2 sensitivity 0.92 and specificity 0.77 while BMI threshold >= 24 sensitivity 0.89 and specificity 0.82. BMI had only moderate correlation with visceral fat, R=0.62, p<.00001. Patient satisfaction was significantly higher with water compared to positive density oral contrast p<0.00001.

CONCLUSION

Our results suggest VFI >23.76 cm/m2 and BMI >24.37 are predictive of adequate CT bowel and peritoneal evaluation with oral water contrast. VFI had better diagnostic accuracy than BMI in predicting optimal CT evaluation, yet these are only moderately correlated.

CLINICAL RELEVANCE/APPLICATION

There is benefit to including VFI in addition to BMI when determining which CTs will benefit most from receiving positive density oral contrast versus water. Additionally, oral water significantly improves patients' experience compared to positive density contrast.

GIS-THA

Gastrointestinal Thursday Poster Discussions

Thursday, Dec. 5 12:15PM - 12:45PM Room: GI Community, Learning Center

GI

AMA PRA Category 1 Credit ™: .50

FDA Discussions may include off-label uses.

Participants

Lauren F. Alexander, MD, Jacksonville, FL (*Moderator*) Spouse, Stockholder, Abbott Laboratories; Spouse, Stockholder, AbbVie Inc; Spouse, Stockholder, General Electric Company

Sub-Events

GI358-SD-THA1 Deep Learning Assisted MRI Prediction of Tumor Response to Chemotherapy for Patients with Colorectal Liver Metastases

Station #1

Participants
Haibin Zhu, MD, Beijing, China (*Presenter*) Nothing to Disclose
Ying-shi Sun, MD,PhD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Xiao-Ting Li, Peking City, China (*Abstract Co-Author*) Nothing to Disclose
Xiao-Yan Zhang, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

13811403328@163.com

PURPOSE

To predict the response to preoperative chemotherapy in patients with colorectal liver metastases (CRLM) with a deep learning algorithm and the histological tumor regression grading (TRG) in a prospective study

METHOD AND MATERIALS

Between January 2013 and November 2016, consecutive CRLM patients (<= 5 lesions) scheduled to receive preoperative chemotherapy followed by liver resection were included. All patients received pre- and post-treatment MR examinations (including T2WI and DWI sequence) on a 1.5T device. Pathology tumor response grade (TRG) was obtained, and lesion by lesion radiologic-pathological correlation of all CRLMs was conducted. Deep learning models were constructed for discrimination between response (TRG1/2) and non-response (TRG3/4/5) on lesion-level, the result was compared with RECIST criteria. In addition, the performance of deep learning model on patient-level was tested using survival analysis.

RESULTS

155 patients (328 lesions) were included, chronologically 101 (264 lesions) for training and 54 (64 lesions) for testing. In testing cohort of 16 response lesions and 48 non-response lesions, DC3CNN model including both pre- and post-treatment MRI information (Model A) achieved an accuracy of 0.875 and an AUC of 0.849 for discrimination of response, which was much better than RECIST (accuracy: 0.578; AUC: 0.615) and the model only include the pre- T2WI and DWI alone (Model B) (accuracy: 0.797; AUC: 0.635), the model only include the post-T2WI and DWI alone (Model C) (accuracy: 0.859; AUC: 0.686). The DC3CNN model defined response and non-response group presented different survival outcomes (P=0.03 and 0.04 for DFS and OS), similarly as pathology discrimination did. However, RECIST criteria defined response group and non-response group didn't yielded significantly different survival outcomes (P= 0.12 and 0.99 for DFS and OS, respectively).

CONCLUSION

The MRI based DC3CNN model could provide surgeons accurate prediction of tumor response to preoperative chemotherapy in CRLM patients. The model may be helpful for providing surgeons individualized information of treatment response and risk for prognosis.

CLINICAL RELEVANCE/APPLICATION

The deep learning model using MRI dataset is capable for preoperative, noninvasive, individualized prediction of TRG in CRLM, which achieved a good diagnostic performance according to pathology (overall accuracy of 87.5%).

GI359-SD-THA2 Value of MRI as A Screening Tool for Hepatocellular Carcinoma in a High-Risk Population

Station #2

Participants
Federico I. Fiduzi, BSC, Rotterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Francois Willemssen, MD, Hoogstraten, Belgium (*Abstract Co-Author*) Nothing to Disclose
Gabriel P. Krestin, MD, PhD, Rotterdam, Netherlands (*Abstract Co-Author*) Nothing to Disclose
Robert A. De Man, MD, PhD, Rotterdam , Netherlands (*Abstract Co-Author*) Nothing to Disclose
Roy S. Dwarkasing, MD, PhD, Rotterdam, Netherlands (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

f.fiduzi@erasmusmc.nl

f.mduzi@erasmusmc.nl

PURPOSE

The purpose of this study was to investigate the utilization of full MRI liver protocol as a screening tool for hepatocellular carcinoma (HCC) in high-risk patients.

METHOD AND MATERIALS

Patients in a HCC surveillance program, who were deemed unsuitable for ultrasound, underwent yearly screening with full MRI liver protocol from January 2010 to January 2019. These cases were evaluated to assess underlying liver disease (hepatitis, grade of cirrhosis) and detection rate of HCC. Patients with HCC were re-evaluated by 2 experienced radiologists for proper characterization conform LIRADS V 2018. Characteristics of HCC (early or advanced) and causes for possibly surveillance failure with advanced HCC on first detection were investigated.

RESULTS

A total of 240 patients were included (170 (71%) male; median age 57 years, IQR 50-64 years). The median number of MRI examinations received per patient was 4, IQR 3-7. Cirrhosis was present in 198 (83%) patients; most (91%) with Child-Pugh A (CP-A). Non-cirrhotic hepatitis was present in the remaining 42 patients. Forty-two (17.5%) patients developed HCC: 41 patients in underlying cirrhosis (81% CP-A) and one patient in non-cirrhotic hepatitis. A Total of 52 HCC lesions were detected: 33 (79%) patients had single lesion; 8 patients (19%) had multiple lesions and 1 patient (2%) had diffuse infiltrative HCC. HCC lesions were classified as LIRADS 4 (n=9); LIRADS 5 (n=43) and LIRADS 5 diffuse (n=1). Lesion size was median 21mm (IQR 6-29mm). Thirty-four (81%) patients had early HCC conform BCLC staging system. Patients with early HCC had a significant shorter time interval between MRI with first detected HCC and previous screening MRI (median 12 months) compared to patients with intermediate, advanced or terminal stage HCC (median 25 months).

CONCLUSION

MRI has a HCC detection rate of 17.5% in a surveillance program of high-risk patients. Most (81 %) patients had early HCC. Cases of advanced HCC can be regarded as surveillance failure with a significant longer time delay between MRI with first detected HCC and previous screening MRI when compared to patients with early HCC.

CLINICAL RELEVANCE/APPLICATION

Yearly full MRI liver protocol has a HCC yield in 17.5% of patients in a surveillance program and can be recommended whenever ultrasound is deemed inadequate.

GI360-SD-THA3 Cirrhosis-Like HCC - A New Subtype of HCC? A Clinical, Pathologic, And Radiologic Correlation

Station #3

Participants
Jonathan Tefera, New Haven, CT (*Presenter*) Nothing to Disclose
Lynn J. Savic, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Julius Chapiro, MD, New Haven, CT (*Abstract Co-Author*) Research Grant, Guerbet SA; Consultant, Guerbet SA; Research Grant, Koninklijke Philips NV; Consultant, Koninklijke Philips NV; Research Grant, Boston Scientific Corporation;
Brian S. Letzen, MD, Orange, CT (*Abstract Co-Author*) Nothing to Disclose
David Mulligan, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Ramesh Batra, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Dhanpat Jain, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Xuchen Zhang, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose
Margarita V. Revzin, MD, New Haven, CT (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

Julius.chapiro@yale.edu

PURPOSE

To establish a new subtype of HCC and compare its histologic, clinical and radiologic characteristics to the scirrhous and conventional variants of HCC.

METHOD AND MATERIALS

In this HIPPA-compliant, IRB-approved, retrospective study, a board-certified pathologist identified 24 scirrhous (SC-HCC) and 29 cirrhosis-like (CL-HCC) lesions and randomly selected 30 conventional (CV-HCC) lesions from 290 cases. CL-HCC was defined as a subtype distinct from cirrhotomimetic HCC with multiple nodules encircled by fibrous septa in one mass lesion mimicking cirrhosis pathologically. Baseline clinical data at diagnosis were systematically collected. Liver function tests and AFP were assessed using a Mann-Whitney U and a X2-test, respectively. A board-certified radiologist examined the radiologic appearance of SC-HCC and CL-HCC on contrast-enhanced MRI based on major and ancillary LIRADS (Liver Imaging Reporting and Data System) features. Notable feature differences were further analyzed using Fisher's exact test. Correlation of imaging features with histologic findings was performed.

RESULTS

CL-HCC cases showed lower AST (p=0.006) and ALT (p=0.030) levels than CV-HCC. No differences in age, gender, etiology, AFP, or liver function tests were observed between SC-HCC and CL-HCC. Despite the notable overlap of histologic features, CL-HCC compared to SC-HCC presented with higher rates of washout (p=0.0001) and multiple hypointense nodules embedded into enhancing septations on the delayed phase (p<0.0001), a novel imaging feature that correlates with histology findings. Though not significant, SC-HCC was more likely to show rim-arterial enhancement (p=0.054), a previously identified imaging feature of SC-HCC, and satellite lesions (p=0.103).

CONCLUSION

Despite the notable overlap of histologic features, CL-HCC can be distinguished on MRI based on already existing and novel distinct imaging features.

CLINICAL RELEVANCE/APPLICATION

Though limited by sample size, this study establishes radiologic and pathologic characteristics that differentiate CL-HCC, a new subtype of HCC, from SC-HCC.

GI387-SD-THA4 Reduction of Motion Artifact and Improvement of Lesion Visibility of the Left Lobe in the Liver: Usefulness of Velocity-Compensated Diffusion-Weighted MRI

Station #4

Participants
Keisuke Ishimatsu, MD, Fukuoka, Japan (*Presenter*) Nothing to Disclose
Akihiro Nishie, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshiki Asayama, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yasuhiro Ushijima, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomohiro Nakayama, MD, PhD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yukihisa Takayama, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yuichiro Kubo, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Yuta Akamine, Tokyo, Japan (*Abstract Co-Author*) Employee, Koninklijke Philips NV

PURPOSE

To investigate if the velocity-compensated diffusion-weighted MRI (vc-DWI) affects the degrees of motion artifact and lesion visibility in the left lobe of the liver as compared with conventional DWI (c-DWI).

METHOD AND MATERIALS

Eleven patients with hepatocellular carcinoma (n = 5) or liver metastasis (n = 6) in the left lobe were included in the study and underwent liver MRI. All examinations were performed on a clinical 3.0 T MR scanner (Achieva, Philips). Both c-DWI and vc-DWI were acquired using single-shot spin-echo echo planar imaging sequence with following parameters: TR/TE = 833/64 ms, thickness = 7 mm, slices = 7, b = 800 s/mm2, NSA = 3, scan time = approximately 210 s, fat suppression, respiratory and peripheral pulse unit triggering. A pair of monopolar gradients was used as motion probing gradients in c-DWI whereas dual bipolar gradient was used in vc-DWI. Two abdominal radiologists evaluated the severity of signal loss (signal loss score) of the left and right lobe of the liver in a consensus fashion as follows: 1 = negligible; 2 = mild; 3 = moderate; and 4 = severe. Further, signal intensity ratio of lesion to muscle (SIR) was measured in each patient to evaluate the visibility of the lesions. Comparison of signal loss score and SIR was performed between c-DWI and vc-DWI.

RESULTS

The mean tumor size was 2.21 ± 1.10 cm (0.9-4.5cm). The mean signal loss score of the left lobe in the vc-DWI was significantly lower than that in the c-DWI (1.82 ± 0.75 vs 3.00 ± 1.00, $p < 0.01$) whereas the mean signal loss score of the right lobe did not show significant difference. The mean SIR in the vc-DWI was significantly higher than that in the c-DWI (2.87 ± 1.59 vs 2.14 ± 1.56, $p < 0.05$).

CONCLUSION

Using dual bipolar diffusion gradients, all phase sensitivity to constant velocity motion during the diffusion weighting period was removed. Therefore, vc-DWI could reduce the artifact mostly due to the cardiac motion in the left lobe and then visibility of the lesion was improved as compared with c-DWI. Since the DWI is a valuable technique for the detection and characterization of liver lesions, vc-DWI might improve diagnostic quality of the lesion in the left lobe of the liver.

CLINICAL RELEVANCE/APPLICATION

(dealing with MR artifact reduction) The lesion detection or characterization in the left lobe of the liver can be improved by using of velocity-compensated diffusion-weighted imaging.

GI384-SD-THA5 Differentiation of Pancreatic Mucinous Cystic Neoplasm from Macrocystic Serous Cystic Adenoma: Feasibility of Radiomic Analysis and Comparison of Diagnostic Performance between Radiomic Model and Radiologists

Station #5

Participants
Huihui Xie, Beijing, China (*Presenter*) Nothing to Disclose
Xiaoying Wang, MD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose
Xiaodong Zhang, MD, PhD, Beijing, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

xiehuihui1030@163.com

PURPOSE

To investigate the feasibility of radiomic analysis in the differentiation of mucinous cystic neoplasms (MCNs) and oligo-cystic serous cystadenomas (O-SCAs) and compare the diagnostic performance of radiomic model with experience radiologists.

METHOD AND MATERIALS

49 Patients (MCN = 25, O-SCA = 24) with pre-surgery multidetector computed tomography (MDCT) scans were retrospectively included in this study. Demographic and radiological characteristics were compared in univariate analyses. Radiomic features extracted from portal venous phase images were calculated and radiomic models were built using the 0.623 + bootstrap method. Two radiologists evaluated multiple CT features and made radiological diagnosis for each patient. The diagnostic performance of the best radiomic model and radiologists were compared in terms of area under the receiver-operating characteristic curve (AUC), sensitivity, specificity and accuracy.

RESULTS

Clinical and most radiological characteristics had no significant significance between patients with MCN and O-SCA except the cyst wall ($P = 0.005$). A model combined by 7 texture features had the best predictive performance. The optimal feature set reached an AUC of 0.82, sensitivity of 72.0%, specificity of 73%, and accuracy of 72%. Diagnostic performance of radiologists reached an AUC

of 0.55, sensitivity of 54.2%, specificity of 64%, and accuracy of 59.2%.

CONCLUSION

Radiomic analysis was feasible in the differentiation of MCN and O-SCA. Diagnostic performance of radiomic model was better than experienced radiologists.

CLINICAL RELEVANCE/APPLICATION

The differentiation of MCN and O-SCA was difficult based on demographic and radiological characteristics. Radiomic analysis was a feasible approach for pancreatic lesion categorization.

GI385-SD-THA6 Diagnostic Performance of Quantitative Ultrasound Parameters for Detection and Classification of Hepatic Steatosis in Nonalcoholic Fatty Liver Disease

Station #6

Participants
Amir M. Pirmoazen, MD, Stanford, CA (*Presenter*) Nothing to Disclose
Aman Khurana, MD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Andreas M. Loening, MD, PhD, San Francisco, CA (*Abstract Co-Author*) Research Grant, Koninklijke Philips NV Consultant, ReCor Medical, Inc
Isabelle Durot, MD, Stanford, CA (*Abstract Co-Author*) Nothing to Disclose
Ahmed El Kaffas, PhD, Palo Alto, CA (*Abstract Co-Author*) Co-founder, Oncoustics
Aya Kamaya, MD, Stanford, CA (*Abstract Co-Author*) Royalties, Reed Elsevier; Researcher, Koninklijke Philips NV; Researcher, Siemens AG

For information about this presentation, contact:

apirmoazen@stanford.edu

PURPOSE

Nonalcoholic fatty liver disease (NAFLD) is a leading cause of chronic liver disease (CLD) worldwide. Early diagnosis and monitoring are critical for disease management and therapeutic interventions. Here, we assess the diagnostic performance of seven quantitative ultrasound (QUS) parameters for detecting and staging hepatic steatosis in patients with or suspected of NAFLD.

METHOD AND MATERIALS

24 patients with or suspected of NAFLD, without any history of other CLDs (12 men, 12 women) were prospectively recruited (average age: 53 ± 14.9, average body mass index: 30.2 ± 6.5) in this HIPAA-compliant IRB-approved study. Informed consent was obtained from all participants. In each patient, up to 12 ultrasound (US) liver acquisitions were obtained using a Philips EPIQ 7 US machine. The following QUS parameters were measured: acoustic attenuation coefficient (AC), hepatorenal index (HRI), spectral intercept (SI), Nakagami parameter, shear wave elasticity (SWE), shear wave viscosity (SWV), and shear wave dispersion (SWD) measures. Proton density fat fraction (PDFF) was calculated for all patients using 3T magnetic resonance imaging within 14 days, which served as the reference standard. Hepatic steatosis was categorized as S0, <5%; S1, 5-10%; S2, 10%-20% or S3 >20% based on PDFF. Diagnostic performance and correlation of QUS parameters to PDFF grading were assessed using receiver operating characteristic (ROC) curves and Pearson correlation coefficients (r), respectively.

RESULTS

Hepatic steatosis categories were near-evenly distributed across our patient population (25% S0, 13% S1, 29% S2 and 33% S3). The AC, HRI, and SI had highest correlations to PDFF (r = 0.82, 0.76, and 0.85 respectively). The Nakagami parameter had a moderate correlation with PDFF (r = 0.73). SWE, SWV and SWD parameters had poor correlations with PDFF (r = 0.46, 0.23, and 0.10 respectively). The area under the ROC curve (AUROC) for AC and HRI for identifying steatosis grades >=1, >=2, and 3 was found to be 0.96, 1.00, 0.87 and 0.95, 0.96, 0.87, respectively.

CONCLUSION

AC, HRI, and SI values are well correlated to PDFF, and can accurately detect and classify hepatic steatosis in patients with or suspected of NAFLD.

CLINICAL RELEVANCE/APPLICATION

QUS parameters such as AC, HRI, and SI are accurate and inexpensive alternatives to MRI-PDFF for detecting and staging hepatic steatosis in NAFLD, which is increasingly becoming a global health concern.

GI386-SD-THA7 The Evaluation of Low-Dose Contrast Media Protocol by Using New Saline Chaser Administered via Spiral Flow Injection Tube on a Single-Source Dual-Energy CT

Station #7

Participants
Tomokatsu Tsukamoto, MS,RT, Onomichi, Japan (*Presenter*) Nothing to Disclose
Takashi Takahata, RT, Onomichi, Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshinori Kawamoto, RT, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose
Keisuke Nishihara, MD, Onomichi, Japan (*Abstract Co-Author*) Nothing to Disclose
Kazunari Mesaki, MD, Onomichi, Japan (*Abstract Co-Author*) Nothing to Disclose
Hiroki Mori, MD, Onomichi, Japan (*Abstract Co-Author*) Nothing to Disclose
Tomoshige Sato, RT, Hiroshima, Japan (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

This study aimed to assess the effectiveness of a saline chaser administered via spiral flow injection tube at a low-dose contrast media protocol in a single source dual energy CT (ssDECT).

METHOD AND MATERIALS

Eighty patients were divided into two groups (spiral flow injection tube/conventional injection tube). ssDECT was performed in each

patient. The contrast medium (360 mgI/kg) was delivered over 30s; subsequently, 30mL saline solution was delivered at the same rate. The study included post-contrast aortic CT during the arterial and delayed phase. We measured the CT number with the same regions of interest (ROIs) at the same slice for aortic arch, abdominal aorta (celiac levels), and iliac artery. The differences (ΔCT) of CT numbers (HU) between two sets (spiral flow tube and conventional tube) were defined to quantitatively evaluate the effectiveness of a saline chaser administered via spiral flow injection tube.

RESULTS

The CT numbers (HU) for the aorta of arterial phase using different tubes were (aortic arch; conventional injection tube[C]:357.8±51.4, spiral flow injection tube[S]:385.7±58.5),(abdominal aorta; C:351.5±50.9, S:381.1±54.9),(iliac artery; C:331.2±47.8 , S:361.4±51.4). Delayed phase results were (aorta arch ; C:138.0±13.2, S:139.0±14.9), (abdominal aorta ; C:143.1±12.5, S:143.6±14.5), (iliac artery ; C:138.1±13.2, S:137.4±15.4), respectively. The ΔCT(HU) for the aorta of arterial phase using different tubes were (aortic arch; 27.9HU (7.8%)),(abdominal aorta; 29.6HU (8.4%)),(iliac artery; 30.2HU(9.1%)).Spiral flow injection tube improved CT numbers by 30 HU compared with use of a conventional injection tube in arterial phase ($p<0.05$).

CONCLUSION

A saline chaser with the use of a spiral flow injection tube showed significant improvement for aorta enhancement at the low-dose contrast injection protocol in a ssDE CT scan.

CLINICAL RELEVANCE/APPLICATION

This study is useful for reducing volume of contrast material by using spiral flow injection tube.

GI319-ED-THA8 From Incidental to Intentional: A Review of Appropriately Managing Imaging Incidentalomas

Station #8

Participants
Stephanie D. Colvin, MD, Birmingham, AL (*Presenter*) Nothing to Disclose
Aaron D. Coleman, MD, Birmingham, AL (*Abstract Co-Author*) Nothing to Disclose
Elainea N. Smith, MD, Birmingham, AL (*Abstract Co-Author*) Nothing to Disclose
Lincoln L. Berland, MD, Birmingham, AL (*Abstract Co-Author*) Consultant, iMedis AI, Ltd
Kristin K. Porter, MD,PhD, Baltimore, MD (*Abstract Co-Author*) Stockholder, Pfizer Inc; Advisory Board, Bracco Group

For information about this presentation, contact:

kkporter@uabmc.edu

TEACHING POINTS

1. Recognize common incidental findings on CT, MRI, ultrasound, and molecular imaging. 2. Understand guidance for management of incidental findings and comprehend important imaging characteristics that influence management. 3. Apply consensus-based guidance to imaging examples of incidental findings.

TABLE OF CONTENTS/OUTLINE

This case-based presentation evaluates incidental findings involving the following organs/structures: A. Renal B. Liver C. Adrenal D. Pancreatic cysts E. Adnexal F. Vascular G. Splenic and nodal H. Gallbladder and biliary

GI320-ED-THA9 Cholangiocarcinoma in 2019: Current Update in Pathology, Classification, and Imaging Findings

Station #9

Awards
Certificate of Merit

Participants
Yashant Aswani, MBBS, San Antonio, TX (*Presenter*) Nothing to Disclose
Andrew Hunt, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Apurva A. Bonde, MBBS, MD, Beaverton, OR (*Abstract Co-Author*) Nothing to Disclose
Alia Nazarullah, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose
Alexander S. Somwaru, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Anil K. Dasyam, MD, Pittsburgh, PA (*Abstract Co-Author*) Nothing to Disclose
Srinivasa R. Prasad, MD, Houston, TX (*Abstract Co-Author*) Nothing to Disclose
Venkata S. Katabathina, MD, San Antonio, TX (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

katabathina@uthscsa.edu

TEACHING POINTS

Discuss recent updates in classification & pathogenesis of cholangiocarcinoma Describe imaging findings of intra and extrahepatic cholangiocarcinomas & their precursors Review role of imaging with special emphasis on radiogenomics & prognostic markers

TABLE OF CONTENTS/OUTLINE

Introduction Classification: Anatomic (Intrahepatic (IHC) & extrahepatic (EHC)), Macroscopic growth pattern (Mass forming, periductal, intraductal & mixed growth), Microscopic features (EHC: adenocarcinoma; IHC: Small duct & large duct types) & Cell of origin (Stem cells in the canals of Hering & peribiliary glands) Risk Factors & precursor lesions (IPNB & MCN), Pathogenesis: IDH1/2, KRAS IHC: large duct type, small duct type, Mimics: Combined HCC/ICC, Intraductal metastases, epithelioid hemangioendothelioma & metastases ECC: perihilar & distal bile ductal Role of Imaging: US, CT, MRI & EUS Radiogenomics: IDH1/2: Intratumoral arteries & arterial/venous phase hyperenhancement Treatments and Prognosis Conclusion Summary: Cholangiocarcinoma is a heterogeneous disease with different subtypes that demonstrate varied clinical behaviors & imaging findings. Precursor lesions & select risk factors demonstrate characteristic imaging findings that can help in early diagnosis. New imaging biomarkers have been identified that assist in treatment & prognostication.

Awards

GI321-ED-THA10 Associating Liver Partition and Portal Vein Ligation for Staged Hepatectomy in Hepatocellular Carcinoma Treatment: What Radiologists Need to Know

Station #10

Cum Laude

Participants
Mengqi Huang, MD, Guangzhou, China (*Presenter*) Nothing to Disclose
Shi-Ting Feng, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Chang Li, MD, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Zi-Ping Li, Guangzhou, China (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

Associating liver partition and portal vein ligation for staged hepatectomy (ALPPS) is a noval surgical approach aimed to induce rapid liver growth. ALPPS is suitable for the treatment of hepatocellular carcinoma (HCC) whose remaining liver volume is unenough to accept a wide range liver resection. Radiologists play an important role in the preoperative and intraoperative assessment. The purpose of this exhibit is : 1. To introduce the procedure of ALPPS and postoperative liver regeneration mechanism in details 2. To discuss the merit, demerits and progress of ALPPS 3. To recommend appropriate imaging to preoperative assessment and during surgery. 4. To recognize complications of ALPPS and corresponding solutions.

TABLE OF CONTENTS/OUTLINE

1.Procedures of ALPPS and its mechanism of liver regeneration. 2.Pros of ALPPS 3.Cons: Unsatisfied liver regeneration, Adhesion, Tumor progress.4. Appropriate imaging for preoperative assessment - CT - MR(emphasize Gd-EOB-DTPA enhanced MRI).5. Appropriate imaging for liver growth assessment before the second stage hepatectomy .6.Complications of ALPPS : Unsatisfied liver growth (AVF, severe liver cirrhosis), Liver failure, Bile leakage, Liver necrosis and infection. 7. The solutions of complications. 8.Summary

GI322-ED-THA11 Texture Analysis in Abdominal Imaging: From Basic Concepts to Applications

Station #11

Participants
Natally Horvat, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose
Jose de Arimateia B. Araujo Filho, MD,PhD, Sao Paulo, NY (*Presenter*) Nothing to Disclose
Davi D. Romao, MD, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Felipe Augusto de M. Machado, Sao Paulo , Brazil (*Abstract Co-Author*) Nothing to Disclose
Joao V. Horvat, MD, New York, NY (*Abstract Co-Author*) Nothing to Disclose
Marcos R. Menezes, MD, Sao Paulo, Brazil (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

natallymhorvat@gmail.com

TEACHING POINTS

-Understand the definition and general concepts of textural analysis (TA) -Understand the definition and general concepts of radiomics, radiogenomics and precision medicine. -Comprehend the workflow process in performing TA, radiomics and radiogenomics -Recognize the most common difficulties and how to overcome them during the workflow process -Know the most relevant applications of TA on CT and MRI in abdominal imaging including both gastrointestinal and genitourinary imaging -Be familiar with the limitations and challenges to be overcome before its implementation into clinical routine.

TABLE OF CONTENTS/OUTLINE

INTRODUCTION: - General concepts of TA, radiomics and radiogenomics WORKFLOW PROCESS - A PRACTICAL GUIDE: - Image acquisition; Creation of a dataset; Image segmentation; Feature extraction and categories (morphological, first-order parameters, second-order parameters, and superior order features); Feature selection and prediction model; Validation GASTROINTESTINAL APPLICATIONS (LIVER, PANCREAS, STOMACH, SMALL BOWEL, RECTAL) GENITURINARY APPLICATIONS (KIDNEY, BLADDER, PROSTATE, UTERUS AND OVARIES) DATA INTERPRETATION: Systematic approach to evaluate the results published in the literature LIMITATIONS AND CHALLENGES: Limitations, pitfalls and challenges FUTURE DIRECTIONS: What's on the horizon

GI323-ED-THA12 Step by Step: A Guide to Barium Swallow for the Study of Anatomy and Function of the Gastroesophageal Junction

Station #12

Awards

Certificate of Merit

Participants
Victor J. Lara Ameca, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose
Yukiyosi Kimura-Fujikami, MD, Mexico, Mexico (*Abstract Co-Author*) Nothing to Disclose
Melissa P. Solano, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

dr.victorlara@gmail.com

TEACHING POINTS

Barium swallow is a non-invasive dedicated radiological evaluation of the most upper gastrointestinal (GI) tract: from the pharynx to the gastric cavity, it has the ability to diagnose both structural changes and motility disorders in the gastroesophageal junction. Because of its dynamic nature it is sometimes modified depending on the patient symptoms and history, and it may be performed as a single or double contrast study. The knowledge of the anatomy of the upper GI tract and the correct barium swallow procedure is necessary for the accuracy in the diagnosis of different pathologies and adequate interpretation of image findings. The aims of this presentation: To review the most common indications for this study. To recognize the normal anatomy of the normal upper gastrointestinal tract, focusing on the GE junction. To describe a step by step procedure to achieve adequate diagnostic images.

To present a systematic approach to appropriate interpretation of barium swallow. To describe and illustrate findings related to morphologic and functional GE junction abnormalities, such as hiatal hernias, postsurgical esophagus, gastroesophageal reflux and other motility disorders.

TABLE OF CONTENTS/OUTLINE

Introduction. Indications. Normal anatomy. Barium swallow step by step: projections and patient position. Illustrative imaging findings. Conclusion.

GI324-ED-THA13 Defecography: Assessment of Different Imaging Methods a Review

Station #13

Participants
Hugo A. Cervantes Flores, MD, Chihuahua, Mexico (*Presenter*) Nothing to Disclose
Maria Jose Acosta Falomir, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Yeni Fernandez de Lara Barrera, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Rocio Iniguez, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Laura M. Sanchez, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

acostafalomir@gmail.com

TEACHING POINTS

• To show the defecography and evaluation of pelvic floor anatomy with different imaging methods • To know the myriad of pathologies assessed with defecography modalities • Recognize the best type of method in certain pathology group to correct characterization • Approach of the evacuation disorders with fluoroscopy and MRI

TABLE OF CONTENTS/OUTLINE

Introduction. Anatomy and physiology of pelvic floor. Normal and anomalous findings. Demographics. Defecography: Systematic approach of the Compartment Abnormalities.

GIS-THB

Gastrointestinal Thursday Poster Discussions

Thursday, Dec. 5 12:45PM - 1:15PM Room: GI Community, Learning Center

GI

AMA PRA Category 1 Credit ™: .50

FDA Discussions may include off-label uses.

Participants
Lauren F. Alexander, MD, Jacksonville, FL (*Moderator*) Spouse, Stockholder, Abbott Laboratories; Spouse, Stockholder, AbbVie Inc; Spouse, Stockholder, General Electric Company

Sub-Events

GI361-SD-THB1 Robotic-Arm Assisted Tele-Sonography: Initial Clinical Results and Feasibility

Station #1

Participants
Nuno A. Pereira da Silva, MD, Coimbra, Portugal (*Presenter*) Nothing to Disclose
Luis Santos, PhD, Coimbra, Portugal (*Abstract Co-Author*) Nothing to Disclose
Filipe Caseiro Alves, MD, PhD, Coimbra, Portugal (*Abstract Co-Author*) Nothing to Disclose
Lucia Neves, Coimbra, Portugal (*Abstract Co-Author*) Nothing to Disclose
Sergio Sousa, Coimbra, Portugal (*Abstract Co-Author*) Nothing to Disclose
Joao Quintas, Coimbra, Portugal (*Abstract Co-Author*) Nothing to Disclose
Rui Cortesao, PhD, Coimbra, Portugal (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

nunoapsilva22@gmail.com

PURPOSE

To determine the clinical feasibility of robotic tele-ultrasound abdominal examinations using the ROSE (RObot Sensing for tele-Ecography) system.

METHOD AND MATERIALS

Twelve patients, 20 to 78 years, were randomly selected from a pool of healthy volunteers. Participants underwent two sets of full abdominal examinations (assessing liver structure, hepatic veins with measurement of the middle hepatic vein, display and measurement of portal vein, common bile duct, gallbladder diameter, head and body of pancreas, longitudinal diameter of spleen, left and right kidney). For each patient the US scans were performed by conventional ultrasound and the ROSE system, consisting in a tele-robotic US arm enabling remote autonomous examinations. All examinations were independently performed by a sonographer with 3 years of US practice submitted to 4 previous learning sessions with the robotic-arm US system.

RESULTS

The 12 volunteers have a mean age ± SD of 35.92 ± 17.4 years, presenting a BMI of 22.38 ± 2.40. Paired-sample t tests showed no statistically significant difference between conventional and robotic-assisted measurements of hepatic middle vein, portal vein and gallbladder. However, statistically significant difference was observed in measurements of spleen, right kidney and left kidney ($P < 0.05$), attributed to increased technical difficulty for the correct positioning of the robotic-assisted probe. Measurement precision seemed to improve with the examiner's experience with the operation of the robotic arm. All pre-determined structures were equally displayed when performing the conventional US scan and the ROSE system. Average time of examination for the robotic tele-ultrasound was 13m09s ± 3m08s while for conventional ultrasound was 6m38s ± 1m15s.

CONCLUSION

Tele-sonography with a dedicated robot-controlled US system is feasible for abdominal sonography. Examinations are longer and a learning curve seems necessary to ease the operation with the 'virtual' probe and master manipulation of the robotic system. No significant differences among measurements or organ display was observed using ROSE except for the left-sided more difficult 'virtual' probe poisoning.

CLINICAL RELEVANCE/APPLICATION

Robotic-assisted tele-sonography is feasible and may be an important tool to grant remote access to clinically relevant US examinations. Further technical improvements for easier "virtual probe" positioning on the left abdomen seems warranted.

GI362-SD-THB2 Measurement of Circumferential Tumor Extent of Colorectal Cancer on CT Colonography: Relation to Clinicopatholical Features and Patient Prognosis

Station #2

Participants
Daisuke Tsurumaru, MD, Fukuoka, Japan (*Presenter*) Nothing to Disclose
Yusuke Nishimuta, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose
Satohiro Kai, MD, Fukuoka City , Japan (*Abstract Co-Author*) Nothing to Disclose
Yoshiki Asayama, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose

Akihiro Nishie, MD, Fukuoka, Japan (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

tsuru-d@radiol.med.kyushu-u.ac.jp

PURPOSE

The purpose of this study was to examine the relation between circumferential tumor extent on CT colonography (CTC) of colorectal cancer (CRC) and clinicopathological features and patient prognosis.

METHOD AND MATERIALS

This retrospective study included 205 consecutive patients (110 men, 95 women; mean age, 64.7 years) with pathologically confirmed CRC who underwent CTC at our institution from 2006 to 2013. Circumferential extent rate (CER) was measured on virtual colon dissection view of CTC according to the following formula: maximal diameter of tumor/maximal diameter of normal mucosa×100. The CER was divided into 0-25%, 0-50%, 0-75%, 0-99%, and 100%. Clinicopathological features including tumor invasion depth, nodal involvement, distant metastasis, and stage (TNM classification) were compared according to the CER (0-25% vs 26-100%, 0-50% vs 51-100%, 0-75% vs 76-100%, 0-99% vs 100%). The continuous and categoric variables were examined by student t test and the X2 test or Fisher's exact test. Patient prognosis was also analyzed according to the CER using Kaplan-Meier method with log-rank test. Differences with p-values <0.05 were accepted as significant.

RESULTS

The CER were significantly correlated with tumor invasion depth for any grade of CER ($P < 0.0001$), nodal involvement (P=0.0025-0.0357) except for CER of 0-99% vs 100% (P=0.0855), and distant metastasis (P=0.0003-0.0130) except for CER of 0-25% vs 26-100% (P=0.0632). According to Kaplan-Meier method with log-rank test, overall survival was not significantly correlated with CER (P=0.1936-0.4026).

CONCLUSION

Circumferential tumor extent was significantly correlated with TNM stage of CRC, but not correlated with patient prognosis.

CLINICAL RELEVANCE/APPLICATION

Circumferential tumor extent could be one of the clinical issues for patients with CRC potentially associated with tumor occlusion. CER can be easily measured on virtual colon dissection view of CTC.

GI363-SD-THB3 Magnetic Resonance Diffusion Kurtosis Imaging in Early Diagnosis of Non-Alcoholic Steatohepatitis: A Preliminary Study in a Rabbit Model

Station #3

Participants
Xianfu Luo, Yangzhou, China (*Presenter*) Nothing to Disclose
Chang Li, Yangzhou , China (*Abstract Co-Author*) Nothing to Disclose
Jianxiong Fu, Yangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Jun Sun, Yangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Song'an Shang, Yangzhou, China (*Abstract Co-Author*) Nothing to Disclose
Jing Ye, Yangzhou, China (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

xianfu-luo@hotmail.com

PURPOSE

To study the feasibility of MR diffusion kurtosis imaging (DKI) for the stratification of nonalcoholic fatty liver disease (NAFLD) and of particular for the early diagnosis of nonalcoholic steatohepatitis (NASH).

METHOD AND MATERIALS

Thirty-two New Zealand rabbits were induced into different severities of NAFLD by high fat feeding. Liver DWI and DKI were performed on a 3.0T MR scanner. The corresponding apparent diffusion coefficient (ADC) from DWI, and DKI-derived parameters FA (fractional anisotropy), MD (mean diffusion) and MK (mean kurtosis) were measured. The correlations between these parameters and hepatic pathological stages determined by NAFLD activity scoring system were analyzed by Spearman rank correlation analysis. The receiver operating characteristic analyses were applied to determine the cutoff values of MD, MK as well as ADC in distinguishing NASH from non-NASH. The diagnostic efficacies of MD and MK in detecting NASH were compared with that of ADC.

RESULTS

Both ADC and MD showed significantly decreased values as the severity of NAFLD increased ($\rho = -0.529, -0.904$, respectively; $p < 0.05$). An opposite pattern was however, found between MK values and NAFLD progress ($\rho = 0.761$; $p < 0.05$). In addition, both MD and MK values were significantly different between borderline and NASH groups (MD: 1.729±0.144 vs. 1.458 ± 0.240um2/ms; MK: 1.096 ± 0.079 vs. 1.237 ± 0.180; $p < 0.05$). Moreover, significant higher area under curve (AUC) values were found for both MD (0.955) and MK (0.905) than ADC (0.736), indicating more robust performance in distinguishing NASH from non-NASH groups.

CONCLUSION

Diffusion kurtosis imaging was feasible for stratifying NAFLD, and could more effectively predict NASH from non-NASH compared with DWI

CLINICAL RELEVANCE/APPLICATION

DKI could serve as a robust technique to stratify NAFLD and also had great potential in early diagnosis of nonalcoholic steatohepatitis. With this first evidence obtained in animal model, DKI will be tested in patients with NAFLD for further validation.

GI388-SD-THB4 Contrast Enhanced Ultrasound (CEUS) for Detection of Immediate Post-Operative Vascular Patency of Pancreas Transplant: Comparison with Doppler Imaging

Station #4

Participants
Jordan K. Swensson, MD, Indianapolis, IN (*Presenter*) Nothing to Disclose
Danielle V. Hill, MD, Zionsville, IN (*Abstract Co-Author*) Nothing to Disclose
Aashish A. Patel, MD, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose
Temel Tirkes, MD, Indianapolis, IN (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

jswensso@iupui.edu

PURPOSE

Vascular complications such as arterial and venous thrombosis are the most common cause of pancreas transplant graft loss in the immediate post-operative period. Doppler ultrasound is currently utilized to evaluate pancreas transplant graft vascularity; however, it is performed as a spot evaluation of vessels, operator dependent and can be difficult to interpret. This study compares the ability of contrast enhanced ultrasound and Doppler ultrasound to identify vascular patency of pancreas grafts in the immediate post-operative period.

METHOD AND MATERIALS

An IRB waiver was obtained. Retrospective analysis of Doppler and CEUS images of 28 consecutive pancreas grafts from 2017 to 2018 was performed by two abdominal radiologists who were blinded to clinical outcomes. Images were obtained immediately following skin closure in the operating room. A total of 23 patients who did not require surgical re-exploration were considered normal. A total of 5 patients had surgically proven arterial or venous pathology at re-exploration. Two radiologists scored each case as vascularity normal or abnormal based on Doppler only and CEUS only image sets.

RESULTS

Both readers demonstrated increased sensitivity for vascular patency using CEUS (80.0% for both readers) compared to Doppler (40.0% and 60.0%). Specificity of CEUS was similar to Doppler imaging (69.6% versus 73.9%). The negative predictive value of CEUS was higher than that for Doppler (94.1% versus 85.0% and 89.5%). Inter-observer variability was higher in the CEUS data than in the Doppler data (kappa = 0.54 versus 0.24).

CONCLUSION

Contrast enhanced ultrasound has better sensitivity and similar specificity compared to Doppler ultrasound for identifying vascular pathology in pancreas transplant grafts in the immediate post-operative setting. A negative CEUS exam has a very high likelihood of excluding the presence of vascular pathology.

CLINICAL RELEVANCE/APPLICATION

Contrast enhanced ultrasound offers higher diagnostic potential than Doppler for the detection of vascular patency in pancreas transplant grafts. CEUS of the pancreas transplant can be performed during the immediate post-operative setting.

GI389-SD-THB5 MRI versus CT for the Detection of Liver Metastases in Patients with Pancreatic Carcinoma: A Comparative Diagnostic Test Accuracy Systematic Review and Meta-Analysis

Station #5

Participants
Mostafa Alabousi, MD, Hamilton, ON (*Presenter*) Nothing to Disclose
Matthew D. McInnes, MD, PhD, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Jean-Paul Salameh, BSC, Ottawa, ON (*Abstract Co-Author*) Nothing to Disclose
Janakan Satkunasingham, MD, Hamilton, ON (*Abstract Co-Author*) Nothing to Disclose
Yoan K. Kagoma, MD, Hamilton, ON (*Abstract Co-Author*) Nothing to Disclose
Leyo Ruo, MD, Hamilton, ON (*Abstract Co-Author*) Nothing to Disclose
Brandon Meyers, MSc,MD, Hamilton, ON (*Abstract Co-Author*) Nothing to Disclose
Tariq Aziz, MD,FRCPC, Hamilton, ON (*Abstract Co-Author*) Nothing to Disclose
Christian B. van der Pol, MD, Hamilton , ON (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

mostafa.alabousi@medportal.ca

PURPOSE

To perform a diagnostic test accuracy systematic review and meta-analysis comparing MRI and CT for the detection of pancreas cancer liver metastases.

METHOD AND MATERIALS

MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, Scopus and multiple radiology society meeting archives were searched until November 2018 to identify studies reporting on liver CT or MRI accuracy for detection of pancreas cancer liver metastases. Demographic, methodologic, and diagnostic test accuracy data were extracted. Accuracy metrics were pooled using bivariate random-effects meta-analysis. The impact of different covariates on accuracy estimates was assessed using a multivariable meta-regression model. These included study design, tumour characteristics, study quality, and MRI protocol. Risk of bias was assessed using the Quality Assessment of Diagnostic Accuracy Studies (QUADAS)-2 tool. PROSPERO CRD42018115089.

RESULTS

Sixteen studies including 1002 patient with pancreas cancer on CT and 966 on MRI were included (210 and 213 patients with liver metastases, respectively). MRI was more sensitive than CT for the detection of liver metastases (84%, 95% confidence intervals [95CI] 75-89% vs. 33%, 95CI 13-62%), with no difference in specificity (96%, 95CI 93-98% vs. 97%, 95CI 91-99%). When four studies including only negative CT exams were removed on sensitivity analysis, there was no difference between MRI and CT sensitivity (85%, 95CI 75-92% vs. 70%, 95CI 53-82%). CT sensitivity was highest in patients without preceding neoadjuvant treatment (P = 0.03). MRI was highest in studies combining 1.5 and 3.0 T vs. 1.5 T (P = 0.04). MRI identified a significant number

of metastases in patients with a prior negative CT; however, multiple sources of bias confounded this finding including a temporal delay between MRI and CT exams.

CONCLUSION

MRI and CT sensitivity for detection of pancreas cancer liver metastases do not significantly differ when selection bias is accounted for. Several studies demonstrated a possible benefit of MRI following a negative CT and further validation regarding imaging workup is required.

CLINICAL RELEVANCE/APPLICATION

MRI and CT accuracy for pancreas cancer liver metastases do not significantly differ. Further research is needed on the role of MRI following a CT showing potentially resectable pancreas cancer.

GI390-SD-THB6 Differences on H-MR Spectroscopy-Based Hepatic Metabolite Concentrations Between Hepatocellular Lesions, Benign Cirrhotic Lesions and Patients without Hepatic Disease: A Pilot Study

Station #6

Participants
Alexa G. Ortiz Escobar I, MD, Mexico City, Mexico (*Presenter*) Nothing to Disclose
David E. Timaran Montenegro, MD , Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Lina M. Parra Guerrero, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Christian Torres Ramirez, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Obdulia Espinosa Oropeza, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Amador Ramirez Gonzalez, RT, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Julita del Socorro Orozco Vazquez, MChir,MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

david_timaran@yahoo.com

PURPOSE

To assess differences on metabolites concentrations between hepatocellular carcinoma (HCC) lesions, benign cirrhotic lesions and patients without hepatic disease, as determined by Hydrogen Magnetic Resonance Proton Spectroscopy (H-MRS).

METHOD AND MATERIALS

An observational, single center, controlled study was performed over a 10-month period. HCC lesions were defined according to LI-RADS criteria, version 2018. Cirrhotic lesions were classified as LI-RADS2 or 3. Control group was defined based on medical records and laboratory results, including infectious screening. Siemens Magnetom 3T-MRI scanner was used in all cases. All patients underwent routine MRI-LIRADS protocol and H-MRS scanning, using multi-voxel technique to quantify choline, lipids, creatine and choline/lipids ratio. Comparisons between groups were made with nonparametric analysis for continuous variables using the Kruskal-Wallis and Dunn's tests.

RESULTS

A total of 24 patients were enrolled, as follows: 12 with HCC lesions (46%), 5 with LI-RADS 2-3 lesions (19%) and 9 (35%) patients in the control group. Median Choline concentrations were as follows: 16.6 ppm (Interquartile [IQR], 9.25-25.2 ppm), 2.14 (IQR, 1.34-3.75 ppm) and 12 ppm (Interquartile ratio [IQR], 9.8-20.4 ppm) in HCC lesions, Li-RADS 2-3 lesions and control group, respectively (p=0.02). More significant differences on Choline concentration were found between the LI-RADS 2-3 group and the HCC lesions (p=0.02). Similarly, the choline/ lipids ratio was significantly higher in the HCC compared to the LI-RADS 2-3 group (0.39 (IQR, 0.13-1.24) versus 0.03 [IQR, 0.02-0.03] [p=0.05]) and the control group (0.08[IQR, 0.05-0.11]) (p=0.03). No significant differences on the concentration of Creatine and Lipids were observed between the groups. Among the HCC lesions, choline concentration was correlated with larger tumor size (r=0.57, p=0.05)

CONCLUSION

Concentrations of choline and choline/ lipids ratio were significantly higher in patients with HCC compared to benign cirrhotic lesions and controls. Among HCC lesions, choline concentration was correlated with larger tumor size.

CLINICAL RELEVANCE/APPLICATION

Opportune diagnosis of HCC is vital. Patients diagnosed at early stages of the disease may be candidates for surgical curative therapy. The use of H-MRS may contribute to early detection of malignant hepatic lesions.

GI391-SD-THB7 Optimization of Contrast Medium for Abdominal CT in Oncologic Patient: A Prospective Comparison Between Fixed and Lean Body Weight-Adapted Injection Protocols

Station #7

Participants
Nicola Panvini, MD, Latina, Italy (*Presenter*) Nothing to Disclose
Damiano Caruso, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Elisa Rosati, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Elena Lucertini, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Giulia Moltoni, Roma, Italy (*Abstract Co-Author*) Nothing to Disclose
Marco Rengo, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Iacopo Carbone, MD, Rome, Italy (*Abstract Co-Author*) Nothing to Disclose
Andrea Laghi, MD, Rome, Italy (*Abstract Co-Author*) Speaker, General Electric Company; Speaker, Guerbet SA; Speaker, Bayer AG; Speaker, Bracco Group; Speaker, Merck & Co, Inc

For information about this presentation, contact:

npanvini88@gmail.com

PURPOSE

To compare the performance of fixed and LBW-adapted contrast media (CM) administration, in terms of objective and subjective image quality and parenchymal enhancement.

METHOD AND MATERIALS

This prospective randomized multicenter study was conducted at two center and was approved by the Institutional Review Board of both participating institutions. Oncologic patients referred clinically for multiphasic contrast-enhanced abdominal CT were prospectively enrolled and divided in two groups following a randomization list: patients in Fixed-Group received a fixed dose of 120 mL of CM while in LBW-Group the amount of CM was computed according to the patient's lean body weight. Patient's characteristics, CM volume, contrast-to-noise ratio (CNR) and signal-to-noise ratio (SNR) of liver, pancreas, kidney, aorta and portal vein, and contrast enhancement index of liver (CEIL), pancreas (CEIP), and kidneys (CEIK) were measured on both arterial phase (AP) and portal venous phase (PVP) and compared between the two groups. Subjective image quality was assessed in duplicate by two experienced abdominal radiologists at each institution, who rated liver, pancreas, and kidney enhancement by using a 5-point Likert scale. Inter-reader agreement for subjective image quality assessment was assessed by using Cohen's K statistics.

RESULTS

The final population consisted of 100 patients (Fixed-Group: 50 patients, 24 males, 63.76 ± 13.21 years, mean BMI: 25.98 ± 4.03 kg/m2, mean LBW: 53.02 ± 9.94 kg; LBW-Group: 50 patients; 23 males, mean age: 67.80 ± 11.91 years, mean BMI: 27.05 ± 5.26 kg/m2, mean LBW: 51.73 ± 8.83; all p >= 0.111). Patients in LBW-Group received a significantly lower amount of CM (103.47 ± 17.65 mL vs 120.00 ± 0.00 mL; p<0.001). LBW-Group accounted for significantly higher arterial CEIL ($p < 0.001$) and CEIP ($p < 0.001$), pancreatic arterial CNR ($p = 0.004$), kidney arterial SNR ($p = 0.016$), and CNR ($p = 0.003$). CEIK was superior in LBW-Group for both AP ($p = 0.002$) and PVP ($p < 0.001$). Significantly lower portal vein SNR ($p = 0.015$) and CNR ($p = 0.020$) were observed in LBW-Group. No significant differences were observed in any of the remaining image quality parameters evaluated on both AP and PVP (all P >= 0.079). Qualitative image quality assessment returned overall comparable results between the two group (all p >= 0.213). Overall inter-rater agreement was excellent for both Fixed- ($\kappa = 0.81$ [95% CI 0.76-0.87]) and LBW- ($\kappa = 0.87$ [95% CI 0.81-0.93]) Groups.

CONCLUSION

LBW-adapted CM administration for abdominal CT reduces the volume of injected CM without affecting image quality and parenchymal enhancement

CLINICAL RELEVANCE/APPLICATION

Lean body weight-adapted contrast media administration protocol provide for significant reduction of injected volume compared to fixed-dose protocol without affecting image quality

GI329-ED-THB8 Open Your Eyes! Similar but Not Equal: A Radiologic-Pathologic Correlation of the Pancreatic Cystic Neoplasms

Station #8

Participants
Nancy Margarita Gutierrez Castaneda, MD, Ciudad de Mexico, Mexico (*Presenter*) Nothing to Disclose
Antonio Hernandez Villegas, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Arturo Angeles Angeles, Ciudad de Mexico, Mexico (*Abstract Co-Author*) Nothing to Disclose
Denny Lara Nunez, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Pablo A. Montiel Tellez I, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Miguel A. Hernandez SR, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose
Diana M. Galvis Zambrano, MD, Ciudad de Mexico , Mexico (*Abstract Co-Author*) Nothing to Disclose
Alina Velez Valle, Cdmx , Mexico (*Abstract Co-Author*) Nothing to Disclose
Aaron H. Perez Segovia, MD, Mexico City, Mexico (*Abstract Co-Author*) Nothing to Disclose

TEACHING POINTS

1. To review the general features of pancreatic cystic neoplasms. 2. To ilustrate the imaging findings and differences of pancreatic cystic neoplasms. 3.To describe the histopathologic characteristics of the pancreatic cystic neoplasms. 4. To associate the clinical presentation, the imaging findings and the histopathological result.

TABLE OF CONTENTS/OUTLINE

1.Introduction 2.General features of pancreatic cystic neoplasms 3.Corrrelation clinical-radiological-histopathological of the pancreatic cystic neoplasms 4.Conclusion

GI325-ED-THB9 Navigating the Canal: Inguinal Canal Pathology and Common Mimics

Station #9

Participants
Andrew Surman, MD, San Francisco, CA (*Presenter*) Nothing to Disclose
Evan A. Raff, MD, Sylmar, CA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

eraff@dhs.lacounty.gov

TEACHING POINTS

1. Review male and female inguinal anatomy and embryology 2. Discuss the pathophysiology of inguinal canal abnormalities 3. Compare differential diagnosis of common and uncommon inguinal canal pathology 4. Review multimodality case examples of inguinal canal pathology and mimics

TABLE OF CONTENTS/OUTLINE

1. Background of inguinal canal anatomy and embryology 2. Review of pathophysiology leading to inguinal pathology 3. Clinical presentations of inguinal canal pathology (Slide 1) 4. Multimodality case review of inguinal pathology including (Slides 2-4): a. Hernias, simple and encysted hydroceles, Canal of Nuck and patent processus vaginalis, varicocele, benign and malignant

lipomatous lesions, hematoma, gonadal pathology, and metastasis. 5. Multimodality case review of inguinal pathology mimics including (Slide 5): a. Hip osteochondromatosis, iliopsoas bursitis, soft tissue infections, endometriosis, adenopathy, femoral artery pseudoaneurysm and varices.

GI326-ED-THB10 Dual-Energy CT of Acute Bowel Ischemia

Station #10

Awards
Certificate of Merit
Identified for RadioGraphics

Participants
Markus M. Obmann, MD, Basel, Switzerland (*Presenter*) Nothing to Disclose
Gopal V. Punjabi, MD, Plymouth, MN (*Abstract Co-Author*) Nothing to Disclose
David J. Winkel, MD, Princeton, NJ (*Abstract Co-Author*) Employee, Siemens AG
Daniel T. Boll, MD, Durham, NC (*Abstract Co-Author*) Nothing to Disclose
Tobias Heye, MD, Basel , Switzerland (*Abstract Co-Author*) Nothing to Disclose
Benjamin M. Yeh, MD, Hillsborough, CA (*Abstract Co-Author*) Research Grant, General Electric Company; Consultant, General Electric Company; Author with royalties, Oxford University Press; Shareholder, Nextrast, Inc; Research Grant, Koninklijike Philips NV; Research Grant, Guerbet SA; ;
Bram Stieltjes, MD,PhD, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose
Matthias Benz, MD, Basel, Switzerland (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

markus.obmann@usb.ch

TEACHING POINTS

There are different underlying pathologies for bowel ischemia. Dual-energy CT increases confidence for the evaluation of all forms of bowel ischemia. Virtual non-contrast (VNC) images can be used to differentiate venous phase hyperdense bowel segments as either contrast enhancing or natively hyperdense without contrast enhancement: VNC images can be generated additionally in cases with no initial suspicion for bowel ischemia where no true non-contrast scan was obtained. VNC images may replace non-contrast phase scans. Iodine maps or iodine overlays can be used to identify bowel loops with decreased or missing contrast enhancement. Low energy virtual monoenergetic images can be used to: Highlight the differences in contrast enhancement of different bowel segments. Increase vascular contrast of mesenteric vessels.

TABLE OF CONTENTS/OUTLINE

Review technical principles of DECT and the implications of different techniques for bowel imaging. Illustrate the benefits of DECT in clinical cases of bowel ischemia. Highlight pitfalls in the interpretation of DECT when evaluating studies for bowel ischemia.

GI327-ED-THB11 The Role of Hepatobiliary Agents and Different Imaging Modality in the Classification of Bile Duct Injuries

Station #11

Participants
Ilkyu D. Oh, BA, Suwanee, GA (*Presenter*) Nothing to Disclose
Nikhar Kinger, MD, Atlanta, GA (*Abstract Co-Author*) Nothing to Disclose
Frank H. Miller, MD, Chicago, IL (*Abstract Co-Author*) Nothing to Disclose
Manohar Roda, MD, Jackson, MS (*Abstract Co-Author*) Nothing to Disclose
Subbaramiah Sridhar, FRCPC,MRCP, Augusta, GA (*Abstract Co-Author*) Nothing to Disclose
Pardeep K. Mittal, MD, Augusta, GA (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

ohilkyu@gmail.com

TEACHING POINTS

1. To describe the difference between extracellular (gadodiamide) and hepatobiliary (gadoxetate disodium) contrast 2. To review different diagnostic imaging modalities for evaluating bile duct injuries 3. To describe the role of hepatobiliary contrast agents in the evaluation and treatment of bile duct injuries

TABLE OF CONTENTS/OUTLINE

1. Anatomy of the cystohepatic triangle 2. Common classification of the bile duct injuries Bismuth Strasburg 3. Common laparoscopic cholecystectomy complications 4. Hepatobiliary contrast agents for hepatic MR Imaging 5. Importance of hepatobiliary contrast agents in accurately recognizing and classifying different bile duct injuries 6. Benefits and limitations of different imaging modalities in assessing bile duct injuries 7. Role of hepatobiliary contrast in evaluating challenging cases

GI328-ED-THB12 Imaging of Extrahepatic Biliary Obstruction: Causes, Clinical Aspects, and Imaging Features

Station #12

Awards
Certificate of Merit

Participants
Akram M. Shaaban, MBBCh, Salt Lake City, UT (*Presenter*) Contributor, Reed Elsevier; Author, Reed Elsevier
Maryam Rezvani, MD, Salt Lake City, UT (*Abstract Co-Author*) Nothing to Disclose
Ayman H. Gaballah, MD, FRCR, Columbia, MO (*Abstract Co-Author*) Nothing to Disclose
Khaled M. Elsayes, MD, Pearland, TX (*Abstract Co-Author*) Nothing to Disclose
Christine O. Menias, MD, Chicago, IL (*Abstract Co-Author*) Royalties, Reed Elsevier

For information about this presentation, contact:

akram.shaaban@hsc.utah.edu

akram.shaaban@hsc.utah.edu

TEACHING POINTS

Recognize the different causes of extrahepatic biliary obstruction and their clinical presentations Describe the imaging features of various causes of biliary obstruction and how to reach a reasonable differential diagnosis

TABLE OF CONTENTS/OUTLINE

I. Intraluminal causes Biliary stones Parasitic infestation: Hydatid disease and Ascariasis Hemobilia Benign intraductal tumors: Intraductal papillary mucinous neoplasm of the biliary tract Malignant tumors invading into bile ducts II. Mural causes Primary sclerosing cholangitis IgG 4 sclerosing disease Portal biliopathy HIV-related cholangiopathy Ischemic cholangiopathy Bile duct carcinoma III. Extrinsic compression Mirizzi Syndrome Periportal adenopathy Pancreatic and periampulary tumors Lemmel syndrome (biliary obstruction by duodenal diverticulum) Hepatic artery aneurysm/pseudoaneurysm IV. Post cholecystectomy complications Postcholecystectomy clip migration Iatrogenic duct clipping

Printed on: 10/29/20

RC709

LI-RADS Update (Interactive Session)

Thursday, Dec. 5 4:30PM - 6:00PM Room: S406A

GI

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Special Information

This is an interactive session. Please bring your charged mobile wireless device (phone, tablet or laptop) to participate.

Sub-Events

RC709A Major LI-RADS Features

Participants
Kathryn J. Fowler, MD, San Diego, CA (*Presenter*) Consultant, 12 Sigma Technologies; Researcher, Nuance Communications, Inc; Contractor, Midamerica Transplant Services; ;

For information about this presentation, contact:

k1fowler@ucsd.edu

LEARNING OBJECTIVES

1) Review the LI-RADS major features of HCC. 2) Understand the operational definitions of major features. 3) Understand the unequivocal requirement of major features and interplay of major features and LR-M features.

ABSTRACT

NA

RC709B Ancillary LI-RADS Features

Participants
Victoria Chernyak, MD,MS, Bronx, NY (*Presenter*) Consultant, Bayer AG

For information about this presentation, contact:

vichka17@hotmail.com

LEARNING OBJECTIVES

1) To learn the appearance, biological rationale and scientific evidence supporting use of ancillary features (AFs) in LI-RADS categorization. 2) To know and correctly use the rules for application of the AFs in LI-RADS v2018. 3) To apply the knowledge of AFs and their applications for various practice cases.

RC709C LI-RADS Treatment Response

Participants
Richard Kinh Gian Do, MD,PhD, New York, NY (*Presenter*) Consultant, Bayer AG; Author, Reed Elsevier; Spouse, Author, Wolters Kluwer nv; Spouse, Data Monitoring Committee, Alk Abello

LEARNING OBJECTIVES

1) Identify differences and similarities between locoregional therapies for HCC. 2) Compare response criteria for HCC. 3) Apply the LI-RADS Treatment Response Algorithm.

ABSTRACT

HCC treatment response to locoregional therapy is assessed routinely by diagnostic radiologists. However, assessment of treatment response is complicated by the proliferation of response criteria and guidelines in recent years. Differences between locoregional therapies, from radiofrequency ablation for solitary masses to transarterial radioembolization of entire lobes, further complicate standardization of response assessment. This lecture will provide an overview of commonly used locoregional therapies for HCC and compare existing response criteria, such as Response Evaluation in Solid Tumors (RECIST) and modified RECIST. These provide context for the recent development of the LI-RADS Treatment Response Algorithm, which will be illustrated in selected cases.

RC709D Challenging LI-RADS Topics

Participants
Mustafa R. Bashir, MD, Cary, NC (*Presenter*) Research Grant, Siemens AG; Research Grant, NGM Biopharmaceuticals, Inc; Research Grant, Madrigal Pharmaceuticals, Inc; Research Grant, Metacrine, Inc; Research Grant, Pinnacle Clinical Research; Research Grant, ProSciento Inc; Research Grant, Carmot Therapeutics; Research Grant, 1Globe Health Institute; Research Consultant, ICON plc;

LEARNING OBJECTIVES

1) Review challenging topics in 2017 CT/MRI LI-RADS, including hepatobiliary agents, LR-M criteria, and the patient populations in

which LI-RADS is/is not applicable.

ABSTRACT

2017 CT/MRI LI-RADS provides guidelines for diagnosis of hepatocellular carcinoma and risk stratification of hepatocellular nodules that are not clearly malignant. However, the assessment of patients who may or may not be at elevated risk for developing hepatocellular carcinoma is more nuanced and requires an understanding of a number of additional concepts. This discussion will focus on the use of hepatobiliary contrast agents, the diagnosis of non-hepatoceillular malignancy, and patient populations in which LI-RADS should or should not be applied.

Printed on: 10/29/20

RC729

Rectal MRI (Interactive Session)

Thursday, Dec. 5 4:30PM - 6:00PM Room: S105AB

GI MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

Sub-Events

RC729A Surgeon Point of View

Participants
Scott Strong, Chicago, IL (*Presenter*) Consultant, Johnson & Johnson; Instructor, Intuitive

For information about this presentation, contact:

scott.strong@nm.org

LEARNING OBJECTIVES

1) Understand the operative options for radical resection of rectal cancer. 2) Describe the imaging features important to planning radical resection of rectal cancer. 3) Realize the implications of changes in imaging features following neoadjuvant therapy.

RC729B MRI Protocol

Participants
Mukesh G. Harisinghani, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

MHARISINGHANI@MGH.HARVARD.EDU

LEARNING OBJECTIVES

1) Provide an overview of MR protocol for rectal cancer staging. 2) Provide pointers on sequence optimization.

RC729C MRI Staging

Participants
Regina G. Beets-Tan, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose

RC729D Response to Neoadjuvant Therapy

Participants
Kartik S. Jhaveri, MD, Mississauga, ON (*Presenter*) Research Grant, General Electric Company; Research Grant, Bayer AG; Speaker, Siemens AG; Speaker, Bayer AG

LEARNING OBJECTIVES

1) Discuss role of MRI in assessing neoadjuvant treatment response in rectal cancer. 2) Review MRI assessment of treatment response. 3) Highlight limitations and pitfalls.

RC729E Case Review

Participants
Mukesh G. Harisinghani, MD, Boston, MA (*Presenter*) Nothing to Disclose
Regina G. Beets-Tan, MD, PhD, New York, NY (*Presenter*) Nothing to Disclose
Kartik S. Jhaveri, MD, Mississauga, ON (*Presenter*) Research Grant, General Electric Company; Research Grant, Bayer AG; Speaker, Siemens AG; Speaker, Bayer AG

For information about this presentation, contact:

MHARISINGHANI@MGH.HARVARD.EDU

LEARNING OBJECTIVES

1) Provide overview of MR imaging in rectal cancer staging. 2) Highlight important technical pointers for accurate staging.

RC829

Abdominal/Pelvic MRI in the Emergent Setting

Friday, Dec. 6 8:30AM - 10:00AM Room: E263

GI GU MR

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

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

LEARNING OBJECTIVES

1) Understand the advantages and disadvantages of MRI in the acute setting for the diagnosis of acute genitourinary disorders. 2) Identify the diagnostic criteria for ovarian torsion and also predict ovarian viability with MRI. 3) Contrast the strengths of different MRI sequences for the diagnosis of pyelonephritis. 4) Apply a rapid, noncontrast MRI protocol for the imaging of acute abdominopelvic pain that is accurate for the diagnosis of acute genitourinary disorders. 5) Discuss clinical and imaging features of a spectrum of entities that present with acute female pelvic pain including complications of fibroids, pelvic inflammatory disease and complicated cysts. 6) Highlight the pathogenesis and pertinent MR imaging features of adnexal (ovarian and tubal) torsion. 7) Assess the relative advantages and disadvantages for MR vs. other imaging modalities for suspected appendicitis in adults. 8) Assess the ability of MR for making alternative diagnoses to acute appendicitis in the setting of non-traumatic abdominal pain. 9) Consider the implications for the potential increased use of MR in the ED for non-traumatic abdominal pain. 10) Identify patients who will benefit from MR enterography in the acute setting. 11) Protocol and perform MR enterography in the acute setting. 12) Identify and report acute findings of Crohn's disease on MR enterography. 13) Discuss the most common indications for abdominal or pelvic MRI in pediatric patients in the emergent setting. 14) Demonstrate and discuss the most frequently encountered MRI imaging manifestations of these conditions. 15) Review the most appropriate MRI protocols for evaluation of pediatric patients presenting to the Emergency Department with acute abdominal or pelvic pain. 16) Discuss available techniques for achieving patient cooperation and limiting exam time in pediatric patients. 17) Understand MRI safety concerns in the setting of pregnancy. 18) Understand indications for emergency MRI during pregnancy. 19) Implement an imaging protocol for emergency MRI during pregnancy. 20) Understand MRI appearance of common acute disease processes during pregnancy.

Sub-Events

RC829A MRI for Acute Genitourinary Disorders

Participants
Bobby T. Kalb, MD, Tucson, AZ (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand the advantages and disadvantages of MRI in the acute setting for the diagnosis of acute genitourinary disorders. 2) Identify the diagnostic criteria for ovarian torsion and also predict ovarian viability with MRI. 3) Contrast the strengths of different MRI sequences for the diagnosis of pyelonephritis. 4) Apply a rapid, noncontrast MRI protocol for the imaging of acute abdominopelvic pain that is accurate for the diagnosis of acute genitourinary disorders.

RC829B MRI for Acute Pelvic Pain in Women

Participants
Christine O. Menias, MD, Chicago, IL (*Presenter*) Royalties, Reed Elsevier

For information about this presentation, contact:

menias.christine@mayo.edu

LEARNING OBJECTIVES

1) Discuss clinical and imaging features of a spectrum of entities that present with acute female pelvic pain including complications of fibroids, pelvic inflammatory disease and complicated cysts. 2) Highlight the pathogenesis and pertinent MR imaging features of adnexal (ovarian and tubal) torsion.

RC829C MRI for Acute Appendicitis and Differential Diagnosis

Participants
Perry J. Pickhardt, MD, Madison, WI (*Presenter*) Stockholder, SHINE Medical Technologies, Inc; Stockholder, Elucent Medical; Advisor, Bracco Group;

LEARNING OBJECTIVES

1) Assess the relative advantages and disadvantages for MR vs. other imaging modalities for suspected appendicitis in adults. 2) Assess the ability of MR for making alternative diagnoses to acute appendicitis in the setting of non-traumatic abdominal pain. 3) Consider the implications for the potential increased use of MR in the ED for non-traumatic abdominal pain.

RC829D MRI for Crohn's Disease in the Acute Setting

Participants

David J. Grand, MD, Barrington, RI (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

dgrand@lifespan.org

LEARNING OBJECTIVES

1) Identify patients who will benefit from MR enterography in the acute setting. 2) Protocol and perform MR enterography in the acute setting. 3) Identify and report acute findings of Crohn's disease on MR enterography.

RC829E MRI for Acute Pediatric Disorders

Participants
Sarah D. Bixby, MD, Boston, MA (*Presenter*) Nothing to Disclose

For information about this presentation, contact:

sarah.bixby@childrens.harvard.edu

LEARNING OBJECTIVES

1) Discuss the most common indications for abdominal or pelvic MRI in pediatric patients in the emergent setting. 2) Demonstrate and discuss the most frequently encountered MRI imaging manifestations of these conditions. 3) Review the most appropriate MRI protocols for evaluation of pediatric patients presenting to the Emergency Department with acute abdominal or pelvic pain. 4) Discuss available techniques for achieving patient cooperation and limiting exam time in pediatric patients.

RC829F Emergency MRI During Pregnancy

Participants
Gaurav Khatri, MD, Irving, TX (*Presenter*) Nothing to Disclose

LEARNING OBJECTIVES

1) Understand MRI safety concerns in the setting of pregnancy. 2) Understand indications for emergency MRI during pregnancy. 3) Implement an imaging protocol for emergency MRI during pregnancy. 4) Understand MRI appearance of common acute disease processes during pregnancy.

Active Handout:Gaurav Khatri

http://abstract.rsna.org/uploads/2019/19001016/Active RC829F.pdf

Printed on: 10/29/20

SST03

Gastrointestinal (Advanced Ultrasound Techniques)

Friday, Dec. 6 10:30AM - 12:00PM Room: E352

GI US

AMA PRA Category 1 Credits ™: 1.50
ARRT Category A+ Credit: 1.75

FDA Discussions may include off-label uses.

Participants
Mark E. Lockhart, MD, Birmingham, AL (*Moderator*) Author, Oxford University Press; Author, Reed Elsevier; Editor, John Wiley & Sons, Inc; Deputy Editor, Journal of Ultrasound in Medicine
Venkateswar R. Surabhi, MD, Sugar Land, TX (*Moderator*) Nothing to Disclose
Lauren M. Burke, MD, Chapel Hill, NC (*Moderator*) Nothing to Disclose

Sub-Events

SST03-01 Non-Enhanced Magnetic Resonance Imaging versus Ultrasonography for Surveillance of Hepatocellular Carcinoma: Intraindividual Comparison in a Prospective Cohort

Friday, Dec. 6 10:30AM - 10:40AM Room: E352

Participants
Dong Wook Kim, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
Hyo Jung Park, 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
Hye Young Jang, Daejon, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sang Hyun Choi, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jae Ho Byun, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seung Soo Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Young-Suk Lim, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
So Jung Lee, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Hyung Jin Won, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jihyun An, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

sykim.radiology@gmail.com

PURPOSE

We aimed to compare the performance of non-enhanced MRI and US as a surveillance tool for hepatocellular carcinoma (HCC) by making intraindividual comparisons in a prospective cohort at high risk of HCC.

METHOD AND MATERIALS

This prospective cohort included 382 patients with an estimated annual HCC risk > 5% who underwent paired gadoxetic acid-enhanced MRI and US between 2011 and 2013. Non-enhanced MRI consisted of diffusion-weighted images (DWI) (b = 0, 50, and 500 s/mm2) and T2-weighted images (T2WI), and was considered positive when a lesion >= 1 cm showed diffusion restriction or mild-moderate T2 hyperintensity on a retrospective analysis. On US, a discrete mass >= 1 cm or a suspicious tumor thrombus was regarded as positive. HCC was diagnosed pathologically and/or radiologically. Sensitivity and positive predictive value (PPV) obtained on a per-lesion and per-patient basis, and specificity and negative predictive value (NPV) obtained on a per-patient basis, were compared between modalities using generalized estimating equations, McNemar tests, and Fisher's exact tests, as appropriate.

RESULTS

Thirty-two HCCs were diagnosed in 28 patients. The per-lesion and per-patient sensitivities of non-enhanced MRI were 84.5% (27/32) and 85.7% (24/28), respectively, and were higher than those of US (34.6% [11/32] and 39.3% [11/28], respectively, P <= 0.001). PPVs were higher on non-enhanced MRI (65.9% [27/41] per-lesion and 64.9% [24/37] per-patient) than on US (32.4% [11/34] and 35.5% [11/31], P <= 0.028), while the specificity of non-enhanced MRI was not significantly different from that of US (96.3% [341/354] for non-enhanced MRI vs. 94.4% [334/354] for US, P = 0.377). The NPV of non-enhanced MRI (98.8% [341/345]) was higher than that of US (95.2% [334/351], P = 0.006).

CONCLUSION

Non-enhanced MRI consisting of DWI and T2WI showed better sensitivity, PPV, and NPV than US. Non-enhanced MRI is a promising option for HCC surveillance.

CLINICAL RELEVANCE/APPLICATION

In patients at high risk of HCC, non-enhanced MRI consisting of DWI and T2WI can be considered an alternative surveillance tool to US.

SST03-02 Comparison of Sound Touch Elastography (STE) and Shear Wave Elastography (SWE) Using Liver

Biopsy as Reference for Diagnosis of Chronic Liver Disease

Friday, Dec. 6 10:40AM - 10:50AM Room: E352

Participants
Ilias Gatos, MSc,PhD, Rion, Greece (*Abstract Co-Author*) Institutional Research Grant, Shenzhen Mindray Bio-Medical Electronics Co, Ltd
Petros Drazinos, PhD,MSc, Kifissia, Greece (*Abstract Co-Author*) Institutional Research Grant, Shenzhen Mindray Bio-Medical Electronics Co, Ltd
Spyros D. Yarmenitis, MD, Athens, Greece (*Abstract Co-Author*) Institutional Research Grant, Shenzhen Mindray Bio-Medical Electronics Co, Ltd
Ioannis Theotokas, Athens, Greece (*Abstract Co-Author*) Institutional Research Grant, Shenzhen Mindray Bio-Medical Electronics Co, Ltd
Eleni Panteleakou, Athens, Greece (*Abstract Co-Author*) Institutional Research Grant, Shenzhen Mindray Bio-Medical Electronics Co, Ltd
Ioannis Koskinas, Athens, Greece (*Abstract Co-Author*) Nothing to Disclose
Pavlos Zoumpoulis, MD, PhD, Kifissia, Greece (*Presenter*) Institutional Research Grant, Shenzhen Mindray Bio-Medical Electronics Co, Ltd

For information about this presentation, contact:

p.drazinos@echomed.gr

PURPOSE

Chronic Liver Disease (CLD) is currently one of the major causes of death and the major cause of Hepatocellular Carcinoma development. Therefore, accurate diagnosis regarding CLD progress is very important. Although Liver Biopsy (LB) is considered as 'Gold Standard' for diagnosis, several non-invasive methods exist in order to avoid LB complications. Sound Touch Elastography (STE) that is available in Resona 7 Ultrasound (US) device and is similar to Shear Wave Elastography (SWE), seems promising but needs to be validated. The aim of this study is to compare the diagnostic performance between the STE and SWE for CLD assessment, using LB as "Gold Standard".

METHOD AND MATERIALS

290 subjects, 68 normal (F0) and 222 with CLD (F1-F4), were included in the study. a B-Mode and Elastographic examination was performed on each patient with Resona 7 and Aixplorer US devices. The STE (Resona 7) and SWE (Aixplorer) measurements were performed on the Right Lobe (RL) of each patient and were compared to LB results according to the Metavir Classification System (F0-F4). Receiver Operating Characteristic (ROC) analysis was then performed for each of the two methods to obtain best cut-off stiffness values.

RESULTS

ROC analysis showed AUCSTE=0.9741 and AUCSWE=0.9854 for F=F4 Cirrhosis, AUCSTE=0.9723 and AUCSWE=0.9755 for F>=F3 Fibrosis Stage, AUCSTE=0.9675 and AUCSWE=0.9662 for F>=F2 Fibrosis Stage, AUCSTE=0.8889 and AUCSWE=0.9288 for F>=F1 Fibrosis Stage. Best cut-off stiffness values were calculated for each method (STE/SWE) compared to Metavir fibrosis stages: F=F4: 12.2/13.5 kPa, F>=F3: 9.5/8.7 kPa, F>=F2: 9.15/8.55 kPa, F>=F1: 6.5/6.05 kPa respectively.

CONCLUSION

Both STE and SWE can differentiate between the 5 Metavir fibrosis stages. SWE seems more reliable in differentiating normal subjects from subjects with CLD (F>=F1) and Cirrhotic patients (F=F4) but less accurate in diagnosing intermediate stages (F>=F2, F>=F3).

CLINICAL RELEVANCE/APPLICATION

Many Elastography technologies emerged with liver in focus. Comparison between them is useful in order to make Elastography reliably applicable to patients regardless of the underlying technology.

SST03-03 ACR US LI-RADS: Outcomes of Category US-2 Observations

Friday, Dec. 6 10:50AM - 11:00AM Room: E352

Participants
John D. Millet, MD, Ann Arbor, MI (*Presenter*) Nothing to Disclose
Ashish P. Wasnik, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
William Masch, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
Mishal Mendiratta-Lala, MD, Ann Arbor, MI (*Abstract Co-Author*) Nothing to Disclose
Katherine E. Maturen, MD, Ann Arbor, MI (*Abstract Co-Author*) Royalties, Reed Elsevier; Royalties, Wolters Kluwer nv; ;

PURPOSE

To evaluate the outcomes of ACR US LI-RADS Category 2 (US-2) observations detected at ultrasound performed for hepatocellular carcinoma (HCC) screening and surveillance.

METHOD AND MATERIALS

In this retrospective, single center study, 138 patients at high risk for HCC (77 men and 61 women; mean age 58.7 years) underwent screening liver ultrasound between January 2017 and December 2018 and were assigned US-2 observations on a prospective clinical basis. Results of follow-up imaging studies and/or histopathology were recorded. Statistical analysis was performed.

RESULTS

The most common indications for HCC screening were cirrhosis (111/138, 80%), chronic hepatitis B virus without cirrhosis (15/138, 11%), and chronic hepatitis C virus without cirrhosis (7/138, 5%). Reasons for US-2 observations were a measureable mass (116/138, 84%; mean size 0.7 ± 0.2 cm; range 0.3-0.9 cm) and a subcentimeter area of parenchymal heterogeneity (22/138,

16%). 72% (99/138) of patients had imaging follow-up and management was discordant with US LI-RADS recommendations in 56% (55/99) of these patients. Confirmatory tests including multiphase contrast-enhanced CT or MRI (61/80), histopathology (6/80), or negative ultrasound follow-up for at least 1 year (13/80) were available for 59% (80/138) of patients. Etiologies of US-2 observations in the subset of 67 patients with CT, MRI, or histopathology included no mass/benign tissue (48/67, 72%), hemangioma (5/67, 7.5%), regenerative nodule (5/67, 7.5%), cyst (3/67, 4%), HCC (2/67, 3%), granuloma (2/67, 3%), LR-3 observation (1/67, 1.5%), and focal steatosis (1/67, 1.5%). Positive predictive value of a US-2 observation for HCC was 2.5%.

CONCLUSION

The positive predictive value of a US-2 (subcentimeter) observation for the detection of HCC is very low. As per US LI-RADS guidelines, US-2 observations can be safely followed with ultrasound rather than escalating workup to contrast-enhanced imaging.

CLINICAL RELEVANCE/APPLICATION

The vast majority of US LI-RADS Category 2 (US-2) observations are benign and can be safely followed with ultrasound.

SST03-04 Subharmonic Aided Pressure Estimation (SHAPE) for Long-Term Follow up of Patients with Portal Hypertension

Friday, Dec. 6 11:00AM - 11:10AM Room: E352

Participants
Ipshita Gupta, MS, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Flemming Forsberg, PhD, Philadelphia, PA (*Presenter*) Research Grant, Canon Medical Systems Corporation Research Grant, General Electric Company Research Grant, Siemens AG Research Grant, Lantheus Medical Imaging, Inc
Jonathan M. Fenkel, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Maria Stanczak, MS, Lafayette Hill, PA (*Abstract Co-Author*) Nothing to Disclose
Priscilla Machado, MD, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Colette Shaw, MBBCh, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Susan S. Noori, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Michael C. Soulen, MD, Lafayette Hill, PA (*Abstract Co-Author*) Consultant, F. Hoffmann-La Roche Ltd; Consultant, Guerbet SA; Research support, Guerbet SA; Research support, BTG International Ltd; Proctor, Sirtex Medical Ltd;
Susan M. Schultz, Philadelphia, PA (*Abstract Co-Author*) Nothing to Disclose
Kirk Wallace, PhD, Niskayuna, NY (*Abstract Co-Author*) Employee, General Electric Company
John R. Eisenbrey, PhD, Philadelphia, PA (*Abstract Co-Author*) Support, General Electric Company Support, Lantheus Medical Imaging, Inc

For information about this presentation, contact:

ipshitagupta89@gmail.com

PURPOSE

To verify if noninvasive contrast-enhanced ultrasound (US) in the form of subharmonic aided pressure estimation (SHAPE) can accurately monitor disease progression or treatment response in patients identified with portal hypertension.

METHOD AND MATERIALS

SHAPE is based on the inverse relationship between the subharmonic amplitude of US contrast microbubbles and ambient pressure. A modified Logiq 9 scanner with a 4C curvi-linear probe (GE, Waukesha, WI) was used to acquire SHAPE data (transmitting/receiving at 2.5/1.25MHz) using Sonazoid (GE Healthcare, Oslo, Norway; IND 124,465). This IRB approved study has enrolled 177 subjects undergoing a transjugular liver biopsy, 22 patients have been identified with clinically significant portal hypertension (median age 59 yrs; 13 Males) based on their HVPG results. These subjects had follow-up clinic visits or CT/MRI scans every 6 months and at those times a repeat SHAPE examination was performed collecting data from the portal and hepatic vein in triplicate. The SHAPE gradient was calculated as the difference between subharmonic signals in the two vessels. Liver function tests (albumin, bilirubin and coagulation panel), MELD scores and presence of ascites and varices were used to establish clinical treatment response.

RESULTS

Of the 22 portal hypertensive cases, 1 patient has had four follow up scans, 1 has had three follow up scans, 3 have had two follow up scans, 7 have had one follow up, 7 have not had any follow up yet and 3 were lost due to death or refusal to follow up. There was a significantly higher signal reduction in the group who were classified as responders according to the SHAPE study compared to the SHAPE non-responders ($p < 0.001$). The mean change in the SHAPE gradient for the responders ($n = 9$) was -4.70 ±3.27 dB vs 1.77±0.55 dB in the SHAPE non-responders ($n = 3$). Results matched the corresponding clinical outcomes of improved MELD scores, improvement in underlying cause of portal hypertension, decreased bilirubin and reduced ascites indicating a reduction in portal hypertension amongst responders.

CONCLUSION

SHAPE can noninvasively monitor disease progression in portal hypertensive patients and hence, may help clinicians in patient management.

CLINICAL RELEVANCE/APPLICATION

Serial SHAPE can be a cost-effective and noninvasive technique to differentiate between portal hypertension treatment responders and non-responders and reduce the need for repeat catheterizations.

SST03-05 Inter-System Agreement and Repeatability of Two-Dimensional Shear Wave Elastography Measurements in Elastic Phantoms and In Vivo Human Livers Across Six Commercially-Available Ultrasound Systems

Friday, Dec. 6 11:10AM - 11:20AM Room: E352

Participants
Leah Gilligan, MD, Cincinnati, OH (*Presenter*) Nothing to Disclose

Andrew T. Trout, MD, Cincinnati, OH (*Abstract Co-Author*) Author, Reed Elsevier; Author, Wolters Kluwer nv; Research Grant, Canon Medical Systems Corporation; Board Member, Joint Review Committee on Educational Programs in Nuclear Medicine Technology; Speakers Bureau, Reed Elsevier; Speakers Bureau, iiCME
Paula Bennett, Cincinnati, OH (*Abstract Co-Author*) Nothing to Disclose
Jonathan R. Dillman, MD, MSc, Cincinnati, OH (*Abstract Co-Author*) Research Grant, Siemens AG; Research Grant, Guerbet SA; Travel support, Koninklijke Philips NV; Research Grant, Canon Medical Systems Corporation; Research Grant, Bracco Group

For information about this presentation, contact:

leah.gilligan@cchmc.org

PURPOSE

To determine inter-system agreement and repeatability of two-dimensional (2D) shear wave elastography (SWE) shear wave speed (SWS) measurements in elastic phantoms and in vivo human livers across six ultrasound systems.

METHOD AND MATERIALS

This HIPAA-compliant study was institutional review board-approved; informed consent was obtained. Serial 2D SWE exams were performed using six commercially-available ultrasound systems (Aplio i800, Canon Medical Systems; LOGIQ E10, GE Healthcare; Resona 7, Mindray North America; EPIQ Elite, Philips Healthcare; ACUSON Sequoia, Siemens Medical Solutions; Aixplorer MACH 30, SuperSonic Imagine). Exams were performed on four elastic phantoms (Model 039, Shear Wave Liver Fibrosis Phantoms; CIRS, Inc., SWS range:0.82-3.51 m/s) by two operators (20 measurements/operator, 1 cm circular region-of-interest [ROI], 4 cm depth) and on 24 fasting adults (14 healthy volunteers, 10 with known liver stiffening) by one operator/system (2 non-sequential exams/system, 10 measurements/exam, 1 measurement/breath-hold, 1 cm circular ROI in right hepatic lobe, 1.5-5 cm deep to capsule). Intra-class correlation coefficients (ICC) were calculated to assess inter-system and test-retest agreement. Interquartile range (IQR)/median and coefficient of variation (COV) values were used to assess patient-level variance.

RESULTS

ICCs for overall inter-system agreement of SWS were 0.99 (95% CI:0.96-1.0) in phantoms and 0.66 (95% CI:0.47-0.81) in humans (Figure). Pairwise ICCs for inter-system agreement in participants across two systems ranged from 0.41 to 0.91. Average patient level variance (IQR/median SWS) across all 288 examinations (24 participants, 12 exams/participant) was 0.07 (mean inter-system range:0.045-0.09), with an average COV of 6.0% (mean inter-system range:4.0-7.5%). Test-retest repeatability in humans was excellent for all systems, with ICCs of: 0.87-0.97.

CONCLUSION

There is good to excellent inter-system agreement of measured SWS in elastic phantoms and in vivo human livers across six 2D SWE ultrasound systems. Test-retest agreement for all systems is excellent. Average patient-level variance of SWS measurements is minimal.

CLINICAL RELEVANCE/APPLICATION

Commercially-available 2D ultrasound shear wave elastography systems exhibit satisfactory inter-system agreement and test-retest repeatability in phantoms and in vivo human livers.

SST03-06 Is There a Role for Ultrasound in the Evaluation of Transplant Graft Small Bowel?

Friday, Dec. 6 11:20AM - 11:30AM Room: E352

Participants
Katy Hickman, MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose
Janette Smith, MBBChir, Cambridge, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
David Hulse, BMBS, Cambo, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Lisa Sharkey, Cambridge, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Edmund M. Godfrey, MBBCh, FRCR, Cambridge, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Andrew Butler, Cambridge, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Sara S. Upponi, MBBS, Saffron Walden , United Kingdom (*Abstract Co-Author*) Nothing to Disclose

For information about this presentation, contact:

katy.hickman@addenbrookes.nhs.uk

PURPOSE

Intestinal graft recipients are subjected to significant doses of radiation. MRI studies may not be feasible acutely. Endoscopic examination of the intestine is usually limited to small sections of the graft. Ultrasound (US) is an established technique in the evaluation of disease extent in patients with small bowel Crohn's, therefore we have utilized US for several years to evaluate the graft small bowel and retrospectively reviewed our findings.

METHOD AND MATERIALS

This is a retrospective review of small bowel US studies performed post operatively for our cohort of 97 patients receiving an intestine-containing transplant (IT) between 2007 and 2019. Imaging interpretation was based of grey-scale images and Doppler imaging. US images were reviewed with subsequent clinical, imaging, endoscopy and histology findings.

RESULTS

97 patients received an IT between 2007 and 2019. There were 45 US studies undertaken in 27 patients. The majority of studies (23 studies in 9 patients) were undertaken in those with biopsy-proven acute cellular rejection (ACR). Imaging findings of mural thickening, loss of mural stratification, reduced peristalsis and mesenteric hypervascularity were observed in 7 patients with ACR. 2 patients with a history of ACR had normal US appearances at follow up, which correlated with endoscopic findings of recovery. Of the US performed for ACR, concurrent endoscopy (within 1 week) occurred in 11 US studies. 8 endoscopies demonstrated features related to rejection confirmed at histology. 3 demonstrated recovery. 5 patients underwent US immediately post-surgery with normal findings consistent with concurrent CT or endoscopy findings. 11 studies in 6 patients demonstrated minimal mural thickening but no further features to suggest rejection, 4 were followed with endoscopy with no features of rejection. The remainder were

followed clinically and radiologically.

CONCLUSION

Small bowel US is a useful technique in establishing normal appearances of the bowel. When interpreted in conjunction with clinical and endoscopic findings in patients with ACR it could have a role in surveillance.

CLINICAL RELEVANCE/APPLICATION

Ultrasound (US) is established in imaging of Crohn's disease. Rejection in intestinal transplantation is evaluated with endoscopic surveillance. We hypothesize that US may be use as an adjunct.

SST03-07 Spleen Elastography as a Predictor of Esophageal Varices

Friday, Dec. 6 11:30AM - 11:40AM Room: E352

Participants
Monica P. Cueva, MD, Quito, Ecuador (*Presenter*) Nothing to Disclose
Jorge R. Aldean, MEd, Quito, Ecuador (*Abstract Co-Author*) Nothing to Disclose
Xavier S. Herdoiza, MD, Quito, Ecuador (*Abstract Co-Author*) Nothing to Disclose
Cristian Armijos, Quito, Ecuador (*Abstract Co-Author*) Nothing to Disclose
Ricardo Chong, Quito, Ecuador (*Abstract Co-Author*) Nothing to Disclose
Maria J. Andrade, Quito, Ecuador (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To evaluate the diagnostic performance of splenic elastography and other non-invasive methods to detect high-risk esophageal varices in patients with cirrhosis. The verification of the existence of varices was performed with upper digestive endoscopy, which is the gold standard.

METHOD AND MATERIALS

A prospective study was performed with 100 patients with a recent diagnosis of cirrhosis who were evaluated with upper abdomen ultrasound, hepatic Doppler, liver elastography, upper digestive endoscopy and that complied with the following criteria: no history of digestive bleeding, no treatment with beta-blockers, no thrombosis of the holder. Splenic elastography was performed by a radiologist with training in elastography using shear wave point elastography with a 5-7MHz convex probe. After the imaging studies, upper digestive endoscopy was performed by two hepatologists who were blinded to the information and the diagnosis of esophageal varices was obtained as well as the classification of patients into three groups: those who had no varices, low-risk varices and high-risk varices. A cross-sectional, unicentric study was carried out from April 2017 until December 2018. The data was organized in frequency tables. The comparison with the gold standard included the use of Chi square and ROC curves were obtained to present sensitivity and specificity data.

RESULTS

Spleen elastography proved to be a good predictive study of the presence of esophageal varices (AUC 0.84, CI 95%: 0.71-0.97), followed by the diameter of the spleen (AUC 0.81, 95% CI: 0.66-0.96), while the congestivity index (AUC 0.46, 95% CI: 0.27 - 0.64) and liver elastography (AUC 0.39, 95% CI: 0.21 - 0.58) proved to be the parameters with less precision. The cut-off point of 3.8m/s in the splenic elastography was able to identify high risk varices with a sensitivity of 90.9%.

CONCLUSION

Splenic elastography demonstrated sensitivity and specificity values similar to the ones published in international studies with adequate correlation with endoscopy for diagnosing high-risk esophageal varices.

CLINICAL RELEVANCE/APPLICATION

Bleeding is the most common and dangerous complication of esophageal varices. With early detection of high-risk varices using a non-invasive technique such as spleen elastogrpahy, patients can start prophylaxis with beta-blockers.

SST03-08 A Diagnostic Role of US-Guided Percutaneous Biopsy in Patients at Risk for Hepatocellular Carcinoma: Comparison with Noninvasive Diagnostic Approaches

Friday, Dec. 6 11:40AM - 11:50AM Room: E352

Participants
Dong Wook Kim, MD, Seoul, Korea, Republic Of (*Presenter*) Nothing to Disclose
So Yeon Kim, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jihun Kang, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Sang Hyun Choi, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Yong Moon Shin, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Seung Soo Lee, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose
Jae Ho Byun, MD, Seoul, Korea, Republic Of (*Abstract Co-Author*) Nothing to Disclose

PURPOSE

To explore a diagnostic role of US-guided percutaneous biopsy for suspicious focal hepatic lesions in patients at risk for hepatocellular carcinoma (HCC) and to compare the results with noninvasive diagnostic approaches using the Liver Imaging Reporting and Data System (LI-RADS) classification

METHOD AND MATERIALS

We retrospectively included 169 lesions in 160 patients at risk for HCC who underwent US-guided percutaneous biopsy for newly developed suspicious hepatic malignancy in 2016. Each target lesion on biopsy was evaluated on CT and/or MRI and was assigned to the LI-RADS v2018 categories. We compared the biopsy results with the LI-RADS categories and evaluated the agreement by using percent agreement and Cohen's kappa statistic after recategorization of the LI-RADS into three groups: (a) favoring HCC (including LR-4, 5, and TIV without targetoid mass) (b) favoring non-HCC malignancy (including LR-M and TIV with targetoid mass)

(c) indeterminate (LR-3). In 30 patients subsequently undergoing surgical excision, agreements with surgical pathology were compared between biopsy results and CT/MRI LIRADS categories by using percent agreement.

RESULTS

US-guided biopsy achieved successful diagnostic results in 81.7% (138/169) without difference across the LI-RADS categories (CT, p = 0.35; MRI, p = 0.86). Among these 138 lesions, 73 lesions were evaluated both on CT and MRI, whereas 65 were solely assessed by using either CT or MRI. Biopsy showed fair-to-good agreement with noninvasive categorization by CT and MRI (κ=0.61 for each) with substantial percent disagreement (CT, 24%; MRI, 23%). Three of LR-3 lesions each on CT (20%) and MRI (27%) were diagnosed with malignancy on biopsy; 3 (7%) on CT and 3 (7%) on MRI favoring HCC were benign on biopsy; 4 (11%) on CT and 3 (7%) on MRI favoring HCC were non-HCC malignancy on biopsy. Biopsy showed higher percent agreement (90%) with surgical pathology than the diagnostic categories on CT (75%) and MRI (70%).

CONCLUSION

Despite its substantial non-diagnostic results, US-guided percutaneous biopsy showed superior diagnostic performance for focal hepatic lesions than noninvasive imaging diagnosis using the LI-RADS classification.

CLINICAL RELEVANCE/APPLICATION

If diagnostically adequate samples are obtained, US-guided percutaneous biopsy poses an important role for classifying hepatic nodules which even show the typical HCC hallmarks on imaging in patients at risk for HCC.

SST03-09 Diagnostic Benefit of Oral Contrast Administration (Small Intestine Contrast-Enhanced Ultrasonography [SICUS]) over Conventional Enteric US in Crohn's Disease

Friday, Dec. 6 11:50AM - 12:00PM Room: E352

Participants
Gauraang Bhatnagar, FRCR,MBBS, London, United Kingdom (*Presenter*) Nothing to Disclose
Laura Quinn, Birmingham, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Anthony Higginson, Portsmouth, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Arun Gupta, MBChB, Wembly, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Richard A. Beable, MBChB, Portsmouth, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Steve Halligan, MD, Herts, United Kingdom (*Abstract Co-Author*) Research Consultant, iCad, Inc
Evgenia Mainta, MD, MMedSc, London, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Uday B. Patel, MBBS, BSc, Sutton, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Andrew Plumb, MBBCh, MRCP, Stockport, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Sue Mallett, DIPLPHYS,MS, Birmingham, United Kingdom (*Abstract Co-Author*) Nothing to Disclose
Stuart A. Taylor, MBBS, Great Missenden, United Kingdom (*Abstract Co-Author*) Research Consultant, Robarts Clinical Trials, Inc; Shareholder, Motilent

For information about this presentation, contact:

g.bhatnagar@nhs.net

PURPOSE

Enteric ultrasound (US) following an oral contrast agent (SICUS) may facilitate better visualisation of the bowel wall compared to unprepared US. The purpose of this study was to compare the diagnostic accuracy of unprepared US and SICUS for detecting small bowel Crohns disease (CD).

METHOD AND MATERIALS

The study utilised patients recruited to a prospective trial comparing the diagnostic accuracy of MRE and US for CD (either newly diagnosed or with relapsing disease) recruited across 8 hospitals. A construct reference standard (multidisciplinary panel diagnosis) was used in the trial, incorporating 6 months of patient follow up. 64 patients underwent standard US followed by SICUS (using 1l of hyperosmolar luminal contrast), performed by the same practitioner, blinded to all clinical data. Practitioners recorded findings on the presence of small bowel/colonic CD after each US examination. Sensitivity and specificity for small bowel disease extent (i.e. presence and correct segmental location) was compared to the trial construct reference standard using bivariate multilevel patient specific random effects models, from paired data using meqrlogit in STATA 14.2.

RESULTS

Sensitivity and specificity for small bowel disease extent was identical between SICUS and unprepared US (71% [58-81] and 86% [49-97] respectively). SICUS specificity for colonic disease was 92%[80-97] and 82%[68-91] for unprepared US, a non-significant difference of 10% (95% CI -2 to 22), p=0.125. Both US and SCIUS detected 9/14 (64%) of segments deemed to be stenosed and causing obstruction by the consensus reference standard . There were numerically fewer false positive diagnoses of obstructing stenosis on SICUS compared to US (7 vs. 11 respectively).

CONCLUSION

We found no evidence that SICUS increases diagnosed accuracy for small bowel disease extent compared to conventional US. Stenosis detection was not improved by SICUS but false positive diagnoses may be reduced.

CLINICAL RELEVANCE/APPLICATION

SICUS offers no significant advantage over standard US for detecting small bowel CD. Given the patient symptom burden induced by ingesting hyperosmolar fluid, first line SICUS cannot be recommended.