MK346-SD-SUA1

The Echogenic Appearance of the Diabetic Deltoid Muscle on Shoulder Ultrasound: Is This Simply from Adipose Tissue Infiltration, Can This Appearance Predict Type 2 Diabetes and be Used to Detect Pre-Diabetes?

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PURPOSE

To evaluate the association of an echogenic deltoid muscle seen in type 2 diabetics during shoulder ultrasound versus the deltoid muscle appearance in non-diabetic obese patients and for any corresponding associations.

METHOD AND MATERIALS

The study included 137 shoulder ultrasounds from type 2 diabetics, including 13 pre-diabetics, confirmed by hemoglobin A1c levels and medications. It also included 49 ultrasounds from non-diabetic obese patients based on body mass index (BMI). Images of the deltoid muscle were blindly reviewed by 3 musculoskeletal radiologists as to whether the appearance was normal, suspected diabetic or definite diabetic. These results along with the patient's age, sex, race, hemoglobin A1c level, BMI, and the use of insulin were analyzed.

RESULTS

A consensus diagnosis of 'definite diabetic' by 3 musculoskeletal radiologists based on an echogenic appearing deltoid muscle on ultrasound was a powerful predictor of diabetic status. The positive predictive value for the accurate designation of 'definite diabetic' was 89% (70 of 79 diabetic patients). An echogenic deltoid muscle was also a powerful predictor of pre-diabetes. Of 13 pre-diabetic ultrasounds reviewed, 13 were assigned either 'suspected diabetic' (3 of 13, 23%) or 'definite diabetic' (10 of 13, 77%) (P= 0.062). Obesity alone cannot solely explain the appearance of an echogenic deltoid muscle in diabetics. Non-obese diabetics were diagnosed 'definite diabetic' with 30% sensitivity (11 of 37 non-obese diabetics). Diabetic patients with a higher BMI, were more often diagnosed 'definite diabetic'. Of 137 diabetic ultrasounds reviewed, 31(22.6%) were designated 'normal' (BMI 30.9 ± 7.3), 36 (26.2%) designated 'suspected diabetic' (BMI 32.6 ± 6.9), and 70 (51.2%) designated 'definite diabetic' (BMI 37.5 ± 8).

CONCLUSION

The ultrasound appearance of an echogenic deltoid muscle is a strong predictor of type 2 diabetes and seems to be due to more than just adipose infiltration. It could be related to impaired insulin-stimulated intramuscular glycogen synthesis or issues with collagen synthesis. We also conclude that this appearance may be used to detect pre-diabetes.

CLINICAL RELEVANCE/APPLICATION

Ultrasound of the type 2 diabetic deltoid muscle demonstrates increased echogenicity which is likely secondary to insulin resistance and may be used as a noninvasive means to detect pre-diabetes.