

International Conference on

Medical Imaging & Diagnosis

October 20-21, 2016 Chicago, USA

Accuracy of cyst vs. solid diagnosis in the breast using quantitative transmission (QT) ultrasound

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We present the results of a receiver operator characteristic (ROC) study using an emerging ultrasound technology, quantitative transmission (QT) ultrasound. We present the readers the accuracy in determining whether a breast lesion is a cyst versus a solid using QT ultrasound. Digital mammograms (XRM) and QT ultrasound imaging were selected from the QT ultrasound library of images. All solid cases had ground truth pathology. Hand held ultrasound images were used as ground truth for cysts. Thirteen readers performed blinded reading of 32 cases (15 solids and 17 cysts) using XRM+QT, assigning both a confidence score (0-100) and a binary classification (solid/cyst) to classify lesions. A 95% percentile bootstrap confidence interval (CI) was computed for the mean readers' area under the ROC curve, sensitivity (proportion of solids correctly classified as solid) and specificity (proportion of cysts correctly classified as cysts). Results show that when a speed of sound measurement >1571 m/s was used to indicate a solid, mean sensitivity and specificity of QT ultrasound were 0.75 (95% CI: 0.56, 0.92) and 0.85 (CI: 0.67, 1.00), respectively. Using the readers' binary classifications with XRM+QT, mean sensitivity and specificity were 0.95 (CI: 0.87, 1.00) and 0.84 (CI: 0.66, 0.98), respectively. When the readers' confidence scores with XRM+QT were used to distinguish solids versus cysts, mean ROC area was 0.923 (CI: 0.830, 0.988). QT ultrasound is an emerging ultrasound technology that demonstrates high accuracy in distinguishing cyst versus solid lesions in the breast.

Biography

Elaine Iuanow has graduated with her Medical degree from Tuft's University School of Medicine and has completed her Fellowship in Breast Imaging at Brigham and Women's/Faulkner-Sagoff Breast Center in Boston, MA. She is the Chief Medical Officer working with the research and development team at QT Ultrasound Labs, a novel breast ultrasound development company based in the San Francisco Bay Area. She brings her significant expertise in Breast Imaging as a Board Certified Radiologist with experience in administering world class care at premier medical institutions in the United States. Her research interests include breast ultrasound, entrepreneurship in health care delivery models, providing care to underserved women, breast disease in female and male patients, and advocacy regarding preventative breast health on the local, national and global arenas.

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