Transmitted sound wave mammography

This study was designed to look at a new type of totally harmless breast imaging called whole-breast transmission ultrasound to see if it could do something mammography cannot do – that is to diagnose the presence of benign cysts and solid lumps in the breast. To avoid the additional imaging work-up, follow-up, and unnecessary procedures, as well as the significant anxiety and psychological burden experienced by women, transmission ultrasound of the breast aims to improve accuracy and prevent women from additional work- up and procedures while maintaining a high sensitivity for the diagnosis of early breast cancer.

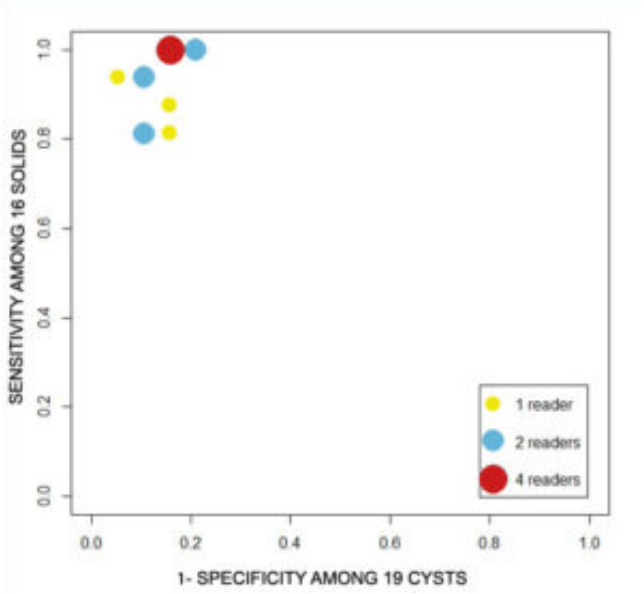

Fig. 1. Detectability (sensitivity) and accuracy (1-specificity) of transmitted ultrasound imaging in the breast. Both of these are more than 92% accurate.

We took mammograms and transmission ultrasound images at five different medical centers. The subjects included a cross section of women at the participating facilities who were of diagnostic age. The mean age was 54 years for the 27 subjects included in the reading session with known dates of birth. Fourteen board-certified/board-eligible diagnostic radiology readers participated in this study. Ninety-seven cases from the QT Ultrasound imaging library were reviewed by an independent reviewer for inclusion in the reader session. Ground truth was available for all abnormalities. The 14 readers performed blinded, randomized review of the eligible cases.

The figure shows the readers' estimated sensitivities and 1-specificities.

Transmission ultrasound is a new (FDA-approved) technology that uses transmission sound wave

imaging to evaluate breast microanatomy and look at tissue detail at a higher level than previous was possible. The technology provides high accuracy in distinguishing cyst versus solid lesions in the breast without the need for a mammogram. Our study suggests that readers can use the QT images and successfully use the speed of sound measurements to aid in distinguishing a cyst versus a solid lesion, with an average reader accuracy of >92%.

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