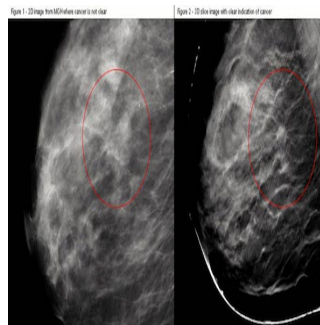## 3-D Breast Imaging Improves Mammography Accuracy

Mammography screening for breast cancer is successful when it reduces mortality, and that depends on the accurate detection of small cancers, which have not metastasised. Tomosynthesis is a three-dimensional breast imaging method which, when used in addition to digital mammography, is associated with two advantages: a drop in the proportion of patients recalled for more imaging tests, and an increase in cancer detection rates. A study reporting these results appears in the 25 June issue of JAMA.

Breast cancer mortality has been reduced by modern methods of screening, such as mammography, although 40,000 American women die annually from the disease. Meanwhile, controversy continues about when and how often women should be screened, which tools should be used, and how to manage different types of lesions. Limited sensitivity, false positive results and overdiagnosis of clinically insignificant lesions are three criticisms of current methods of mammography screening. In 2011, the US Food and Drug Administration approved tomosynthesis to be used as a supplement to standard digital mammography.

Multisite Study Supports The Use of Tomosynthesis

Researchers at Advocate Lutheran General Hospital in Park Ridge, Illinois conducted a study with data from 13 healthcare centres. The team, led by Sarah M. Friedewald, MD, evaluated 454,850 digital breast examinations: 281,187 digital mammograms without tomosynthesis and 173,663 exams with the additional 3D technique. Their aim was to determine whether mammography in combination with tomosynthesis raises the accuracy of breast screening programmes, as has been shown by some single-institution studies.

Four primary outcomes were measured: recall rate, cancer detection rate, and positive predictive values for recall and for biopsy. Recall rate refers to the proportion of patients who required further imaging based on the results of a screening exam. Positive predictive value for recall was a measure of the proportion of patients who were recalled subsequent to screening, and were then diagnosed with breast cancer. Positive predictive value for biopsy refers to the proportion of patients diagnosed with breast cancer after undergoing biopsy.

Data analysis revealed that there was a decrease in the model-adjusted recall rate of 16 per 1,000 screens when tomosynthesis was used in combination with digital mammography. The addition of tomosynthesis improved the positive predictive value for recall from 4.3 percent to 6.4 percent. The positive predictive value for biopsy also increased, from 24.2 percent to 29.2 percent.

Less Patient Recall and More Cancer Detection

The findings imply that the use of tomosynthesis as a screening tool could lead to less unnecessary recall and biopsies, without compromising cancer detection rates. In fact, cancer detection increased when the 3D technique was used in conjunction with the standard digital mammography, indicating improved accuracy. The authors write: "Accordingly, the preferential increase in invasive cancer detection with addition of tomosynthesis may be of particular value in optimising patient outcomes from mammography screening." The authors acknowledge that additional assessments of clinical outcomes would lend support for the use of tomosynthesis in breast cancer detection and diagnosis.

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