CAT (Critically Appraised Topic)

Title: Using digital mammography with tomosynthesis to detect breast cancer

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1. Clinical Question: Does the use of tomosynthesis in combination with digital mammography result in better screening and detection rate for breast cancer?

PICO Parts:

P– breast cancer patients
I– tomosynthesis combined with digital mammography
C– digital mammography alone
O– Recall rate for additional imaging, cancer detection rate, and positive predictive values for recall and for biopsy.


a. Database(s) searched: OVID
b. Keyword Search Terms used: breast cancer
c. MeSH Search Terms used: screening, mammography, tomosynthesis

3. Methods Description (setting, population, sample size, study design):

The study was performed using data from 13 academic and non-academic breast cancer centers from March 2011 to December 31, 2012. The population consisted of people undergoing breast cancer screening, and the average age for screening with and without tomosynthesis was 57 and 56.2, respectively. The study compared the performance of breast cancer screening before and after the introduction of digital tomography over 2 periods, respectively. The sample size was 454850, of which 281187 (61.8%) were performed in the first period, and 173663 (38.2%) were performed in the second period. The performance metrics were based on recall rate, cancer detection rate, positive predictive value (PPV) for recall, and PPV for biopsy.

4. Methods Interpretation (Validity):

a. Was there an independent “blind” comparison with a reference standard?

The study included the reference standard of digital mammography alone, however, it was not blinded due to the retrospective nature of the study.
b. Did the sample include an appropriate spectrum of patients to whom the diagnostic/screening test will be applied in clinical practice?

Yes, because the study included patients who were diagnosed with a primary breast cancer and was performed across a diverse array of institutions/practices.

c. Did the results of the diagnostic/screening test being evaluated influence the decision to perform the reference standard?

Yes, because some sites began using tomosynthesis at varied times which could introduce the possibility of selection bias. However, this bias did not affect the results of the study.

d. Were the methods for performing the diagnostic/screening test described in sufficient detail to permit replication?

The details were adequate and clear regarding the practices used in the study, as well as the standards to be compared in order to evaluate the performance of breast cancer screening.

5. Results:

The data indicated that 3D mammography outperformed 2D conventional mammography. Eleven of the thirteen sites showed improvements for key metrics of cancer detection and recall rates. The other two sites had been using tomosynthesis for a short period beforehand. Cancer detection rate increased by 29%, recall rate decreased by 15%.

6. Translational applications (How does this study apply to your patients?):

This is a T3 translational study. There is potential for this retrospective analysis to be used to guide physicians in advising their patients on the method of screening for breast cancer. The results showed that the use of digital mammography + tomosynthesis cancer detection increased by 29% and recall rate decreased 15% compared with digital mammography alone.

However, the benefit of digital mammography + tomosynthesis on patient outcome needs to be further studied before translational applications can be determined.

7. Reference: