Performance of Wide-Angle Tomosynthesis with Synthetic Mammography in Comparison to Full Field Digital Mammography

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Rationale and Objectives

The purpose of this study was to test for superiority of wide-angle digital breast tomosynthesis plus synthetic mammography (Insight 2D) in comparison to full-field digital mammography (FFDM).

Materials and Methods

In this study, twenty readers interpreted 350 screening and diagnostic cases of wide-angle digital breast tomosynthesis (DBT) plus Insight 2D and FFDM in two separate reading sessions separated by at least a 6-week washout period. Breast-level estimates of the area under the curve and sensitivity along with subject-level recall rate were measured and compared between wide-angle DBT plus Insight 2D and FFDM. The same measures were also assessed for dense breasts. A hierarchical analysis plan was used to control the study's type I error rate at 0.05.

Results

The mean breast-level area under the curve for distinguishing breasts with cancer from non-cancer breasts was 0.893 with DBT plus Insight 2D versus 0.837 with FFDM, showing superiority of DBT plus Insight 2D ($p < 0.001$). Breast-level sensitivity was significantly superior for DBT plus Insight 2D in comparison to FFDM (0.852 vs. 0.805, $p = 0.043$). Subject-level recall rate for DBT plus Insight 2D was significantly lower in comparison to FFDM (0.344 vs. 0.473, $p < 0.001$). For dense breasts, the readers' accuracy with DBT plus Insight 2D was superior to their accuracy with FFDM (0.875 vs. 0.830, $p = 0.026$), and their recall rate was significantly lower for DBT plus Insight 2D in comparison to FFDM (0.338 vs. 0.441, $p = 0.003$).

Conclusion

Reader performance with wide-angle DBT plus Insight 2D is superior to that with FFDM, showing significantly higher breast-level accuracy and sensitivity and significantly lower recall rates.

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