Assessing Radiologist Performance Using Combined Digital Mammography and Breast Tomosynthesis Compared with Digital Mammography Alone: Results of a Multicenter, Multireader Trial

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OBJECTIVE

To assess radiologist performance on diagnostic accuracy and recall rate after using breast tomosynthesis combined with digital mammography and digital mammography alone.

MATERIALS AND METHODS

1192 women who gave written consent participated in this multi-reader, multi-center study. Mediolateral and oblique and craniocaudal for both the breasts were obtained in all the women for both the modalities. Comparison of the radiologist performance was done with the help of two reader studies. Study 1 included 12 radiologists and had 312 cases of which 48 were cancer cases, and study 2 included 15 radiologists and had 312 cases of which 51 were cancer cases. Study 1 readers only recorded those cases that had an abnormality and needed to be recalled. Study 2 readers recorded the lesion type and its location. ROC analysis was used to determine the radiologist diagnostic accuracy. BI-RADS score was used to determine the recall rate for noncancer cases, specificity, sensitivity, positive and negative predictive values for the two methods.

FINDINGS

Diagnostic accuracy for the combined modality was superior to that of digital mammography alone for all radiologists.

Study 1:

- Average difference area under the curve was 7.2% (95% confidence interval [CI]: 3.7%, 10.8%; P < .001)

Study 2:

- Average difference area under the curve was 6.8% (95% CI: 4.1%, 9.5%; P < .001)

The addition of tomosynthesis resulted in a significant decrease in recall rates for noncancer cases for all radiologists. The addition of tomosynthesis increased the sensitivity and with largest increase for invasive cancers 15% and 22% in studies 1 and 2 versus 3% for in situ cancers in both studies.

CONCLUSION

Radiologist performance for diagnostic accuracy and recall rate significantly improved for with the addition of tomosynthesis to digital mammography.

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