

Breast Cancer Screening Using Tomosynthesis and Digital Mammography in Dense and Non-dense Breasts

Elizabeth A. Rafferty, Melissa A. Durand, Emily F. Conant, Debra Somers Copit, Sarah M. Friedewald, Donna M. Plecha, Dave P. Miller, MS

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Objective

Using data from their previous multicenter study, the authors evaluated the differential screening performance of digital mammography combined with tomosynthesis compared with digital mammography alone as a function of breast density.

Materials and Methods

The screening performance data, from the 13 U.S. institutions, were reported for 12 months using digital mammography alone (beginning March 2011 to October 2012) and from the date of introduction of tomosynthesis until December 31, 2012 (range, 3-22 months). All institutions utilized Hologic's Selenia® Dimensions® system.

Subgroups included the 4 breast density categories used for clinical reporting. Almost entirely fat and scattered fibroglandular densities were considered non-dense tissue patterns, whereas heterogeneously dense and extremely dense were considered dense tissue patterns.

Overall and invasive cancer detection rates and recall rate with and without tomosynthesis were analyzed in patients with both non-dense and dense breasts. Positive predictive value for recall was calculated.

Results

Of 452,320 examinations, 278,906 were digital mammography alone and 173,414 digital mammography plus tomosynthesis; 2157 cancers were diagnosed. Recall rates per 1000 screens in non-dense breasts decreased from 90 to 79 and in dense breasts from 127 to 109 with tomosynthesis. Positive predictive value of recalls increased in both non-dense and dense breasts. Cancer detection rates also increased in both groups.

For subgroups of breast density, improvements in rates were greatest for women with scattered fibroglandular densities and heterogeneously dense breasts. Differences were mostly not significant for almost entirely fat and extremely dense subgroups.

Discussion

Breast density is associated with reduced mammographic sensitivity and specificity. Additionally, increased tumor size and worsened prognosis are associated with increased breast density. Dense breast tissue may also represent an independent risk factor for breast cancer. The addition of tomosynthesis to digital mammography for screening was associated with an increase in cancer detection rate and a reduction in recall rate for women with both dense and non-dense breast tissue. These combined gains were largest for women with heterogeneously dense breasts, potentially addressing limitations in cancer detection seen with digital mammography alone in this group, but were not significant in women with extremely dense breasts. For women classified as having dense breast tissue, most have heterogeneously dense breasts, mandating caution in drawing conclusions regarding the performance of tomosynthesis for the small proportion of women with extremely dense breasts.

hologic.com | info@hologic.com | +1.781.999.7300

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