Mammographic Breast Density and Subsequent Risk of Breast Cancer in Postmenopausal Women According to Tumor Characteristics

Conclusions

The findings suggest that higher mammographic density is associated with more aggressive tumor characteristics and also with in situ tumors.

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Background

Few studies that investigated the associations between breast density and subsequent breast cancer according to tumor characteristics have produced inconclusive findings. We aimed to determine whether the associations between breast density and subsequent breast cancer varied by tumor characteristics.

Methods

We included 1042 postmenopausal women diagnosed with breast cancer between June 1, 1989, and June 30, 2004, and 1794 matched control subjects from the Nurses’ Health Study, an ongoing prospective cohort study of 121 701 registered female nurses across the United States. Breast density was estimated from digitized images using computerized techniques. Information on breast cancer risk factors was obtained prospectively from biennial questionnaires before the date of cancer diagnosis for case subjects and matched control subjects. Polychotomous logistic regression was used to assess associations of breast density with tumor subtypes based on invasiveness, histology, size, grade, receptor status, and involvement of lymph nodes. All tests of statistical significance were two-sided.

Results

The risk of breast cancer increased progressively with increase in percent breast density (Ptrend < .001). Women with higher breast density (≥50%) showed a 3.39-fold (odds ratio = 3.39, 95% confidence interval = 2.46 to 4.68) increased risk of breast cancer compared with women with lower breast density (<10%). The associations between breast density and breast cancer risk were stronger for in situ compared with invasive tumors (P heterogeneity < .01), high-grade compared with low-grade tumors (P heterogeneity = .02), larger (>2 cm) compared with smaller (≤2 cm) tumors (P heterogeneity < .01), and estrogen receptor–negative compared with estrogen
receptor-positive tumors (Pheterogeneity = .04). There were no differences in associations by tumor histology, involvement of lymph nodes, and progesterone receptor and HER2 status (Pheterogeneity > .05).

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