Cohort study of Copenhagen screened women with BI-RADS and automated density data

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Abstract

Background

Density is a significant risk factor for breast cancer. To assess whether screening works differently in women with different breast density, we used data from women screened from 1 November 2012 -31 December 2013 in the Copenhagen mammography program, Denmark. The mammograms were given a radiological Breast Imaging-Reporting and Data System (BI-RADS) density grade by a radiologist, and automated computerized density scores.

Methods

BI-RADS and computerized scores were available for 55004 of 74324 screened women. We calculated risk ratios (RRs) with 95% CI, for screen detected cancer using BI-RADS, Volpara Density Grade (VDG), Volume of dense tissue (VDTQ), and Volpara breast density (VBDQ), all classified 1-4 by % dense breast tissue (1 being the lowest), and positive predictive values (PPVs).

Results

For all score types, women in the 3rd quartile (heterogeneously dense parenchyma) had increased RRs for screen detected cancer compared with women in the 1st quartile (almost entirely fatty tissue). This pattern was not seen for women in the 4th quartile (entirely dense parenchyma), except for VDTQ which showed an RR of 1.61 (95% CI 1.22 – 2.13). The overall PPV of a positive screen was 24%. For BI-RADS1 the PPV was 29% versus 20% for BI-RADS4 (p=0.072). For VDG the

figures were 27% for grade 1 versus 19% for grade 4 (p=0.023), and for VDTQ and VBDQ these numbers were 24%/24% (p=0.960) and 27%/21% (p=0.056).

Conclusion

Although dense breast tissue is associated with increased risk for breast cancer, women with the highest density score did not have the highest risk of screen detected breast cancer, one likely reason being masking. For BI-RADS, VDG and VBDQ, the PPV for the highest density score was lower than that of the lowest density score, possibly due to higher recall rate, while there was no difference for levels of VDTQ.