EDITORIAL

Breast Mammographic Changes Among Women Adopting a Low-Fat Eating Pattern

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Boyd et al. (1), in this issue of the Journal, report reductions in the area of mammographically dense tissue among women undertaking a low-fat, high-carbohydrate diet (hereafter, a low-fat eating pattern) in a randomized trial context. The trial involves women in the age range of 30-65 years whose baseline mammographic images showed radiologic densities in at least 50% of the breast area, based on a single craniocaudal view of one randomly selected breast. The women assigned to dietary intervention were taught how to make a major isocaloric dietary change, with a goal of 15%, 20%, and 65% of energy from fat, protein, and carbohydrates, respectively, while the control group consumed a self-selected diet.

The article is based on 817 women (403 in the intervention group and 414 in the control group) from whom follow-up mammographic images were obtained at about 2 years from randomization. Matched baseline and follow-up mammographic images were analyzed in a blinded, computer-assisted fashion to estimate total breast area and total area of dense tissue from each mammographic view. Intervention women experienced a modest, but significantly greater, reduction than control women in both breast area (2.5% in the intervention group and <0.1% in the control group) and area of density (6% in the intervention group and 2.5% in the control group). The difference in total breast area, but not in density area, appeared to be largely attributable to differential weight change (average, 0.3-kg weight loss for intervention women; average, 0.9-kg weight gain for control women). The change in percent of breast area with density did not differ significantly between intervention and control women. The differential reduction in area with density seemed most evident among the 76% of women who were premenopausal at baseline, especially in the subset of 90 women (50 in the intervention group and 40 in the control group) who became postmenopausal during the 2-year follow-up period.

The hypothesis that a low-fat eating pattern may reduce breast cancer risk has considerable public health importance and has yet to be adequately tested. Experimental studies in rodents showed radiologic densities in at least 50% of the breast area, based on a single craniocaudal view of one randomly selected breast. The women assigned to dietary intervention were taught how to make a major isocaloric dietary change, with a goal of 15%, 20%, and 65% of energy from fat, protein, and carbohydrates, respectively, while the control group consumed a self-selected diet.

The background just mentioned motivates the conduct of human intervention trials to test the practically important hypothesis that undertaking a low-fat eating pattern in the middle and later decades of life can reduce the risk of breast cancer and other diseases (e.g., colon cancer and coronary heart disease) among healthy women. In addition to smaller trials conducted by Boyd and colleagues (1) and by the Women’s Health Trial Study Group (7), a full-scale trial of a low-fat eating pattern among postmenopausal women is currently under way as a part of the Women’s Health Initiative (8). To date (February 1997), about 32,000 women have been enrolled at one of 40 U.S. Clinical Centers out of a target enrollment of 48,000 women. The difference between intervention and control group percent energy from fat at 1 year from randomization in this large trial is virtually identical to that (10.9%) reported by Boyd et al. (1). However, the planned completion of the Women’s Health Initiative is still 8-9 years away, making information on the effects of a low-fat eating pattern on intermediate outcomes, such as radiologic features of breast mammographic images, timely and important.

Changes in mammographic density seem a particularly instructive intermediate outcome in view of the well-established relationship between such densities and breast cancer risk in both premenopausal and postmenopausal women (9,10). For example, the large Breast Cancer Detection Demonstration Project cohort study (10) yielded relative risk estimates of 1.48, 1.99, 2.08, 3.24, and 3.35 for approximate quintiles of area of breast density compared with women with no breast density. Analysis

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See “Note” following “References.”
of the Canadian Breast Screening Study data (9) leads to a summary assessment (1) that a 406-mm² difference in the area of dense breast tissue corresponds to a 3% difference in breast cancer risk. In comparison, after 2 years of dietary change intervention, women experienced a 376-mm² average reduction in the area of density versus a 153-mm² average reduction among control women. Hence, one might project a corresponding modest 3 \( \frac{376 - 153}{406} \approx 1.65\% \) lesser breast cancer risk among intervention women compared with control women at 2 years from randomization corresponding to this difference in the area of mammographic density. This compares with a 13.7% lower breast cancer risk in intervention versus control women over an average 9-year follow-up period assumed in the design of the Women’s Health Initiative Clinical Trial (11). In comparison, if the reported difference in the area of breast density accumulates in a roughly linear fashion over a 9-year period, such changes would project only a 7.4% difference in breast cancer incidence by the end of the follow-up period. Of course, there are various other pathways by which a low-fat eating pattern may reduce breast cancer risk, some of which are described by Boyd et al. (1).

In summary, the authors have presented some stimulating results on an intermediate outcome that may be quite relevant to the hypothesized relationship between a low-fat eating pattern and breast cancer prevention. The ability to interpret their results is somewhat reduced by the fact that a significant intervention versus control difference was not observed in the percent of breast area with density, a predictor of breast cancer risk that is as strong as the absolute area of density (10). Also, follow-up mammographic images were obtained from only 69% of the 1182 women for whom requests were made. This reduces somewhat the value of randomization as a means of preventing confounding, although the authors note that known breast cancer risk factor distributions did not differ between women providing or not providing such mammographic images.

Longer-term observation on the effects of a low-fat eating pattern on radiologic features of the breast and on the effects of a low-fat eating pattern on such features and breast cancer incidence jointly will be important to establish a role for mammographic changes as a potential surrogate (12) for breast cancer in the evaluation of studies of dietary change for breast cancer prevention.

References


Note

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