The relation of breast size to breast cancer risk in postmenopausal women (United States)

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Abstract

Objective: Breast size has been hypothesized to predict a woman’s risk of breast cancer although studies in the main have not supported an association. In a large, population-based case-control study we examined whether breast size might emerge as a significant risk factor among very lean women in whom breast size might be a truer reflection of the volume of gland mass at risk for malignant change.

Methods: The data derive from a population-based case-control study of women aged 50 to 79 years conducted in several New England states and Wisconsin. Incident cases of invasive breast cancer (n = 2015) were identified through state tumor registries and controls (n = 2556) were selected at random within age strata from population lists. Telephone interviews were conducted to obtain information on known and suspected risk factors which included bra dimensions (cup and back size) prior to a first birth, or at the age of 20 for nulliparous women.

Results: We observed a significant positive association for cup size which was limited to women who were the most lean as young adults based on chest circumference. Among those reporting a chest size under 34 inches multivariate-adjusted relative risks were 1.34 (95% CI: 1.04 to 1.74) for cup size B, and 1.76 (95% CI: 1.04 to 3.01) for cup size C and larger, compared to a cup size smaller than B, and the trend for increasing cup size was statistically significant (P = 0.005). There was no relation with breast size among women reporting an average or larger back circumference (34 inches or larger).

Conclusion: Breast size before a pregnancy is a positive predictor of postmenopausal breast cancer, but this association is limited to those who were especially lean as young women.

Introduction

Breast size is a plausible risk factor for breast cancer, as it may serve as a proxy for the volume of ductal epithelium at risk. It also reflects fat depots in the breast, which contribute to local estrogen levels [1], and may act as a repository for lipid-soluble carcinogens. Breast cancer has a slight predilection for the left breast [2], which tends also to be the larger breast in many women [3, 4]. A benefit for smaller breast size is suggested by the lower incidence of breast cancer in women having undergone cosmetic breast augmentation [5] or breast reduction surgery [6, 7]. However, with few exceptions [8–10] studies relating breast size to breast cancer risk have not supported an association, whether size was estimated based on mammography [4, 11–13], bra cup measurements [14–18] or self-assessment [19, 20]. However, most studies included small numbers of cases, and few accounted for the influence of overall body fatness, which has complex relations with breast cancer...
incidence varied [21]. Also, the timing of breast size measurement varied, generally postdating the period of childbearing, which may have contributed to misclassification and confounding of associations by parity and lactation experience. We examined the relation of breast cancer to breast size as estimated by preparous bra size dimensions in a large population-based case control study.

Subjects and methods

The Collaborative Breast Cancer Study (CBCS) is an ongoing study of determinants for breast cancer conducted in the states of Massachusetts, New Hampshire and Wisconsin. Details of the study design and characteristics of participants have been published [22]. Women aged 50 to 79 years with a new diagnosis of invasive breast cancer were identified through state cancer registries. Community controls were selected at random (within age strata) from lists of licensed drivers (women aged 64 and younger) and Medicare beneficiaries (women aged 65 and older). Structured telephone interviews were conducted between 1992 and 1995. The interview covered known and suspected risk factors for breast cancer, including body habitus. Bras in the United States are sized according to cup size (A, B, etc) and the girth of the chest or back circumference (30, 32, 34 inches, etc). Hence, a woman’s bra size would be designated as ‘32A’ or ‘36C’, and so on. To estimate breast size we asked, “Before your first pregnancy (or around the age of 20, if nulliparous) what was your bra size?” Subjects were then asked: “What was your usual cup size?”. A total of 2015 participating case and 2556 control women were asked the questions on cup size and back circumference. Data were also collected on recent weight (prior to diagnosis in cases) and maximum adult height (height at age 20). Response rates were 83% of cases, and 78% of the controls. A total of 161 cases and 166 controls were reinterviewed a median of 3.5 months following initial interview to assess reliability of the data: in both cases and controls, concordance between responses was high both for back circumference (combined Spearman $r = 0.81$; $P < 0.0001$) and cup size (combined Spearman $r = 0.84$; $P < 0.0001$). Estimates of relative risk according to bra size were obtained in logistic regression models which included terms for age, state, and other confounding risk factors including current BMI and height, first degree family history of breast cancer and benign breast disease; age at menarche, parity, race and other breast cancer risk factors did not materially alter relative risks.

Results

Bra cup size was moderately correlated with back circumference (Spearman $r = 0.50$ in controls; $P < 0.0001$) and less strongly with recent body mass index (Spearman $r = 0.18$; $P < 0.0001$); back circumference was modestly associated with height at age 20 (Spearman $r = 0.20$; $P < 0.0001$). A total of 162 (8%) cases and 213 (8%) controls could not report their bra size as young adults. Less than 1% (24 of 4571) reported never wearing a bra in that era.

Relative risks for cup size are shown in Table 1, according to back circumference, as a proxy for overall adiposity in young adulthood. There was no relation with breast size among women reporting average or larger back circumference (34 inches or larger). However, we observed a significant positive association in the smaller women: adjusting for height, current adiposity (BMI: kg/m²), and other breast cancer risk factors, relative risks were 1.34 (95% CI: 1.04 to 1.74) for cup size B, and 1.76 (95% CI: 1.04 to 3.01) for cup size C and larger, compared to women reporting smaller sizes

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<td>≥ C</td>
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<td>29</td>
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<td>* RR adjusted for age, state, current BMI and height, first degree family history of breast cancer and benign breast disease. Bra cup size was unknown or the subject refused in a total of 172 cases and 223 controls.</td>
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