

Left Handedness and Breast Cancer

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OLSSON AND Ingvar [1] claim their data show a relation between left-handedness and risk of breast cancer. This conclusion is not valid because the cases and controls were not comparable. The oldest woman in the control (reference) group was 65, whereas the median age of the cases was 62. Thus, virtually half of the cases were older than the whole of the comparison group.

In many societies, left-handedness was strongly discouraged until recent times, so that older people are much less likely to be left-handed. In any case-control study, it is important for the groups being compared to be closely similar with respect to age. In a study of handedness it is essential for the groups to be very similar with respect to year of birth, which will correspond with age if the groups are contemporary (this is unclear in the report by Olsson and Ingvar). It is also desirable for the groups to be similar in place of birth (or at least place of residence), as rates of left-handedness might vary from region to region. In the study by Olsson and Ingvar, the cases came from Lund whereas the controls were from the whole of Sweden.

It is not surprising that three studies have found a low prevalence of left-handedness among breast cancer patients. Because of the late age at diagnosis, most women will have grown up in the early part of this century. The observed rates were 1.5% [1], 3.5% [2] and 2.6% [3], markedly lower rates than are found in younger cohorts. The reference group studied by Olsson and Ingvar was 21 years younger on average, and had a prevalence of left-handedness of 5%.

Their study cannot be used to make any valid inferences about the relation between breast cancer and handedness because of the inappropriately chosen control group.

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3. Hsieh C-C, Trichopoulos D. Breast size, handedness and breast cancer risk. *Eur J Cancer* 1991, 27, 131-135.

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DR ALTMAN raises some important questions regarding the validity of our recent paper. We were not able to do a straightforward age adjustment in the study because we only had aggregated data for the referents. However, when limiting the breast cancer patients to only premenopausal patients (that is to give them approximately the same median age and median birth year as the referent group), only 2 of 127 (1.6%) were left-handed, suggesting that a more refined age adjustment would not have altered the main result.

Further, there are as yet no data suggesting that the frequency of left handedness varies in an important way geographically in the homogenous Swedish population. It should in this context be noted that our health care region from which our breast cancer patients are recruited represent one fifth of the Swedish population. However, we are in a new prospective study on handedness and breast cancer using referents from the general population and from the same geographical area as the patients. This study will allow for a more sophisticated age and birth year adjustment. Looking at the referents so far interviewed in this study (243 women with a median age of 64 years, range 22-85), the frequency of left handedness is 12/243 (4.9%). Thus, these data do not suggest that there are important geographical variations in the frequency of left handedness or that an important bias due to the age or birth year differences in our previous study has been operating. In our new study we will, however, investigate if there is a difference in the effect between pre- and postmenopausal women, as an early life factor would be expected to influence premenopausal breast cancer risk more than postmenopausal risk.

It would also be interesting to know if the postulated different frequency by Altman of left handedness between geographical areas and birth cohorts mainly refer to different training of ambidextrous individuals while the individuals with "true" left handedness (or right cerebral dominance) are rather constant, regardless of culture or birth cohorts. It is, therefore, important in studies to have strict definitions of left handedness and exclude ambidextrous to be classified as left handed.

Since our paper appeared, another study by Sandson *et al.* (*Lancet* 1992, 339, 523-24) has been published describing a reversed cerebral asymmetry in women with breast cancer judged from cranial computed tomographies lending support to the theory that an intrauterine or early life factor, probably hormonal, could predispose to breast cancer in adulthood.

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