Efficacy of Bilateral Prophylactic Mastectomy in Women with a Family History of Breast Cancer

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Background
The treatment of breast cancer has changed dramatically over the past two decades. Advances have included the recognition that breast conserving surgery when combined with radiotherapy offers similar survival compared to mastectomy. This finding has enabled many women to preserve their breast and maintain a high likelihood of cure. However, one controversial issue concerns the management of women who have a high risk of breast cancer but no evidence of disease. The treatment options for these women range from careful observation to bilateral prophylactic mastectomy. The benefit of bilateral prophylactic mastectomy is not one hundred percent, as many lay people mistakenly believe, because this surgery does not remove all breast tissue and there remains a small but real chance of developing a breast cancer. Physicians from the Mayo clinic undertook a study to determine the exact benefit of bilateral prophylactic mastectomy. The results of this study are published in the January 14, 1999 issue of The New England Journal of Medicine.

Methods
The authors retrospectively reviewed the records of all women who underwent prophylactic mastectomy at the Mayo Clinic between 1960 and 1993. Six hundred and thirty nine women with a family history of breast cancer were identified. The women were classified as high risk or low risk based on several parameters. High risk was defined by the presence of one or more of the following criteria:

- two or more first degree relatives with breast cancer;
- one first degree and two or more second or third-degree relatives with breast cancer;
- one first degree relative with breast cancer and one or more relatives with ovarian cancer;
- two second or third degree relatives with breast cancer and one or more with ovarian cancer;
- three or more second or third degree relatives with breast cancer;
- one first degree relative with bilateral breast cancer;
- one first degree relative with breast cancer before the age of 45 years and one other relative with breast cancer.

Two hundred fourteen women were considered as high risk and 425 as moderate risk. Of the 425 women with a moderate risk of breast cancer, 268 had a first degree relative with breast cancer, 111 had a second degree relative with breast cancer, and 46 had two second degree relatives with breast cancer.

The observed number of breast cancers that occurred in these women was compared to the number predicted to have occurred based on the Gail model and from data on breast cancer occurring in sisters of the high risk group. The Gail model is based on data from over 200,000 women, all Caucasian, who were screened for breast cancer for five consecutive years. Based on the number of breast cancers occurring in these women, a model was developed that predicts the incidence of breast cancer within a population. The model is based on the age at menarche, the age at first live birth, the number of previous breast biopsies, the number of first degree relatives with breast cancer and whether atypical hyperplasia is present in the breast biopsy.

Results
The median length of follow-up was 14 years. Prophylactic mastectomy was determined to provide a significant benefit. Using the Gail model, 37 breast cancers were predicted to occur in the 425 moderate risk women, but only 4 breast cancers were actually diagnosed. In the high-risk group, the effect of prophylactic mastectomy was estimated by examining the number of breast cancers occurring in sisters. Four hundred and three sisters were studied and 38% of these women had a diagnosis of breast cancer (the majority of these occurred prior to their sisters’ prophylactic mastectomy). In contrast, the incidence of breast
cancer in the high-risk group was one percent.

Conclusions
Prophylactic mastectomy reduces the risk of breast cancer in women with a family history. However, many factors must be considered before mutilating surgery is performed. These include the risk of breast cancer, the ease of the breast examination (breast tissue consistency impacts on the ability to detect a lump), and the sensitivity of the mammography (breast tissue density impacts on the ability to detect a mass with mammography).

In an accompanying editorial, researchers from Canada make the point that the publics' perception of breast cancer must be put in perspective. For example, the risk of women dying from breast cancer is substantially lower than dying of cardiovascular disease. In addition, breast cancer is not even the most common cause of cancer death among women: lung cancer is. The fear of breast cancer is promulgated by a statistic that was widely quoted to promote women to have annual mammography: that 1 in 9 women will get breast cancer in their lifetime. While this remains true, the majority of women with breast cancer can be cured, especially if the cancer is detected early.