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Relation between Breast & Prostatic cancer

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Abstract

Nearly 12% of men with advanced prostate cancer have inherited mutations in genes that play a role in repairing damaged DNA, according to a new study. Inherited mutations in DNA-repair genes—including BRCA2, ATM, and CHEK2—are associated with an increased risk of several other cancers, including breast, ovarian, and pancreatic cancer, Therefore, This lead us to assume the possibility of an hereditary relation between these cancers and explore it.

Introduction

Cancers of the breast and prostate are the most common invasive cancers diagnosed among women and men, respectively, they account for nearly 30% of all invasive cancers. A positive family history is a well-established risk factor for both cancers, particularly when they are diagnosed among first-degree family members. The risk increases with an increasing number of affected relatives and is inversely associated with the age at diagnosis of affected relatives. However, the relative risk for either breast or prostate cancer associated with the aggregation of both cancers within families has not been thoroughly investigated. [(1)]

Discussion

Findings from the WHI observational cohort suggest that independently of a family history of breast cancer, a positive family history of prostate cancer among first-degree relatives is associated with a modest increase in the risk of breast cancer diagnosed after the age of 50 years. We report, as have others, that women with a family history of breast cancer are at an increased risk, with risk estimates higher among women with multiple affected first-degree family members. Our results also suggest that African American women at the greatest risk for a diagnosis of breast cancer have a family history of both breast and prostate cancer. [(2)]

Epidemiological studies consistently demonstrate that a family history of the same tumor, particularly among first-degree relatives, is a moderate to strong risk factor for both breast and prostate cancer, with concordant estimates of relative risk ranging from 2.0 to 4.5. Reported estimates are even higher with multiple affected relatives and/or relatives diagnosed with earlier onset disease (typically <50 years at the time of diagnosis for breast cancer and <60 years for prostate cancer). Interestingly, the risk appears slightly higher for both cancers when a full-blood sibling instead of a parent is affected with the same disease, and this suggests some contribution from the environment (particularly the early environment) and/or an interaction between 1 or more genes and early environmental exposures playing an important role in carcinogenesis.

Comparatively, much less is known about the aggregation of breast and prostate cancer within families and the discordant estimates of risk associated with a positive family history. Our findings are similar to those of Sellers et al, who reported that a family history of prostate cancer in a father or brother was associated with a modest increase in postmenopausal breast cancer risk independent of the family history of breast cancer, but a family history of both breast and prostate cancer was associated with an approximately 2.0-fold increase in breast cancer risk. Both Turati et al and Gronberg et al reported an approximately 60% increase in the odds of

a breast cancer diagnosis associated with a history of prostate cancer in any first-degree relative. However, other studies have not observed significant increases in breast cancer risk associated with a family history of prostate cancer. These discrepancies may be attributed to differences in study design and/or the composition of the study participants. In comparison, the majority of studies, but not all, have reported a significant independent association between a positive family history of breast cancer among first-degree relatives and the risk of prostate cancer. [3]

Few studies have reported on the impact of race and family history on the risk of breast and prostate cancer. Among those focused on concordant risk, studies of prostate cancer have reported that African American men in the United States have a risk similar to that of white men with comparable family histories. Alternatively, studies of racial disparities in familial breast cancer are not as clear. The Black Women's Health Study and the Women's Contraceptives and Reproductive Experiences (CARE) study reported similar estimates of the relative risk associated with a positive family history of breast cancer in African American and white women. However, a subsequent report from the CARE study found that after the age of 50 years, risks diverge, with white women having a higher risk of breast cancer in comparison with black women; this was particularly true among those with more than 1 affected first-degree relative. Two case-control studies focusing on discordant risk in African Americans found that men with prostate cancer were more likely to report a family history of breast cancer in a sibling in comparison with controls. To our knowledge, the current investigation is the first to report on racial differences in the risk of breast cancer associated with a family history of prostate cancer. [4]

A genetic explanation for the familial clustering of breast and prostate cancer is currently unknown, but researchers have naturally focused on breast cancer 1 early-onset (BRCA1) and breast cancer 2 early-onset (BRCA2) with the presence of prostate cancer in Ashkenazi Jewish families as well as those meeting criteria for hereditary breast and ovarian cancer syndrome. The results of studies examining the association between either of these genes and prostate cancer have been inconsistent. It has been predicted that germline mutations in BRCA1/2 can explain just a small proportion of the observed clustering of breast and prostate cancer within families, and BRCA2 has been linked to more aggressive prostate cancer clinical features. [5]

The strengths of the current investigation primarily lie in the WHI OS resource. The large population allowed a precise estimation of the breast cancer risk associated with a history of breast and prostate cancer among immediate family members, particularly among those with a family history of both cancers, which is a relatively rare occurrence in the population (~2%). In addition, the prospective nature of the study eliminated the possibility of a misclassification bias produced by differential recall of the family history in breast cancer cases versus non cases. Other important strengths include the long-term follow-up of study participants with central adjudication of breast cancers. Limitations include the relatively small number of African American women with breast cancer in the study and the reliance on self-reporting of the family history of cancer; however, evidence suggests that self-reported cancer family histories are generally accurate, particularly

among first-degree relatives. Because a family history of cancer was assessed only at the baseline, any changes in family histories of cancer were not captured in this analysis. [6]

Conclusion

In summary, a family history of breast cancer and a family history of prostate cancer were each independently associated with the risk of breast cancer diagnosed after the age of 50 years, with the greatest risk observed among women with a family history of both breast and prostate cancer among first-degree relatives. These findings deserve further investigation and may have significant implications because of the contribution of an inherited predisposition for both cancers. Familial clustering of these 2 cancers represents a unique phenotype in which to identify new susceptibility genes. Furthermore, because the contribution of a family history of prostate cancer to breast cancer risk among relatives (and vice versa) is more clearly elucidated, risk communication between the physician and the patient as well as the dissemination of this information from the patient to immediate relatives would be important in shaping the health behaviors (such as screening for early detection) of those family members, even among those of the opposite sex.

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