Gene inheritance patterns influence age of diagnosis in BRCA families

12 December 2011

Women who inherit the cancer genes BRCA1 or BRCA2 from their paternal lineage may get a diagnosis a decade earlier than those women who carry the cancer genes from their mother and her ancestors, according to a new study by researchers at the North Shore-LIJ Health System's Monter Cancer Center in Lake Success, NY. The findings were reported on Thursday, Dec. 8, at the San Antonio Breast Cancer Symposium.

Iuliana Shapira, MD, North director of cancer genetics, and her colleagues conducted a retrospective review of 130 breast or ovarian cancer patients with the BRCA1 or BRCA2 mutations. They chose only those patients who knew the parent of origin. In other words, they could follow along their family tree to see where the breast cancer gene originated from. Some of their families had their own genetic tests done. For others, it was a matter of following the family pedigree.

As expected, a person had a 50-50 chance of getting a mutant BRCA gene from their mother or their father's branch that carried the mutation. It is an autosomal dominant mutation. Looking at the family maps revealed some surprising findings. Contrary to the notion that the BRCA mutations are associated more commonly with Ashkenazi Jews, the scientists found that the BRCA mutations were also in families of Irish and Jamaican descent. "No one had ever conducted a study to look at the parent-of-origin effects," said Dr. Shapira. "Genetic diseases may display parent-of-origin effects. In such cases, the risk depends on the specific parent or origin allele. Cancer penetrance in mutations carriers may be determined by the parent origin of BRCA mutation."

They analyzed 1,889 consecutive (136 ovarian + 1753 breast) breast (BrCa) or ovarian cancer (OvCa) patients presenting for treatment at the Monter Cancer Center between 2007 and 2010. In 130 patients with BRCA 1 or 2 mutations the parent of origin for the mutation was known. Of the 130 patients, two had both BRCA1 and BRCA2 mutated paternally inherited disease and were excluded from this analysis. Of the breast cancer patients: 28 patients had paternal and 29 had maternal BRCA1 mutations, 24 had paternal and 21 had maternal BRCA 2 mutations. Of the ovarian cancer patients, six had paternal and 10 had maternal BRCA1 mutations; seven had paternal and three had maternal BRCA2 mutations.

In carriers of BRCA mutations, the mean age at diagnosis for ovarian cancer was 51 (range 21-70) and for breast cancer was 43 (range 24-78). But when they compared the mean age at diagnosis in the maternal versus paternal inheritance, they were surprised to find that breast cancer patients with a BRCA1 maternal inheritance, the age of diagnosis was on average around 45. By comparison, women with BRCA1 paternal inheritance were diagnosed around 38. For breast cancer BRCA2 maternal inheritance, the average age of diagnosis was 50 compared to 41 years old for those with a BRCA2 paternal inheritance.

There was no significant difference between paternal and maternal age of ovarian cancer diagnosis of BRCA1 or BRCA2 mutations.

"If this observation is duplicated in larger cohorts the results will have important implications for recommendation of surgical risk reduction in BRCA mutation carriers," said Dr. Shapira. "That would mean that doctors might think about watching and waiting in young woman with BRCA mutations inherited from her mother's family and being more aggressive in young women who inherited the mutation from their father's side."

Provided by North Shore-Long Island Jewish (LIJ) Health System

APA citation: Gene inheritance patterns influence age of diagnosis in BRCA families (2011, December 12) retrieved 19 September 2022 from https://medicalxpress.com/news/2011-12-gene-inheritance-patterns-age-diagnosis.html