BRCA Genes and Cancer Risk

Some women (and even some men) carry mutations in their *BRCA* genes which increase their risk of getting breast, ovarian, and other cancers at a young age. This article gives a brief overview of what *BRCA* genes are, what happens when a *BRCA* gene has mutations, who is most likely to have a mutation, and how to live with a *BRCA* gene mutation.

What is *BRCA*?

BRCA stands for BReast Cancer susceptibility gene. There are two *BRCA* genes known as *BRCA1* and *BRCA2* and everyone has them—you get one from your mother and one from your father. These genes produce tumor-suppressing proteins. Normally, these proteins help prevent cancer by repairing damaged DNA. However, when one or both of these genes have changes or mutations then your risk of cancer can increase. [1]

How much does a *BRCA* mutation increase the risk of cancer?

When the *BRCA* genes have mutations, your cells are more likely to divide rapidly or in an uncontrolled way. This can lead to the development of cancer. Only 5-10 percent of all breast cancer cases in women are attributed to *BRCA1* and *BRCA2* mutations, but women with harmful mutations in their *BRCA* genes have a much higher risk for developing cancer at some point in their lives than the average woman.

For women with harmful *BRCA* mutations, their risk of developing breast cancer by the age of 70 years old increases from about 12 percent to roughly 50-70 percent. Likewise, the risk of developing ovarian cancer jumps from 1.3 percent of women in the general population, to 39 percent of women with a harmful *BRCA1* mutation and 11 to 17 percent of women with a harmful *BRCA2* mutation.

Mutations in *BRCA1* and *BRCA2* have been shown to increase the risk of several other cancers as well: women with *BRCA* mutations may have a higher risk of developing fallopian tube cancer and peritoneal (lining in the abdomen) cancer; men with these mutations have an increased risk of breast or prostate cancer; and men and women with *BRCA1* or *BRCA2* mutations may be more likely to develop pancreatic cancer or acute myeloid leukemia. [2]

Who is at risk?

You can inherit a *BRCA* mutation from either of your parents. If one of your parents or siblings carries such a gene mutation, then your risk of also having the mutation is roughly 50%.

In addition, some people are more at risk for a *BRCA* mutation than others. If your family or personal history includes any of the following, then you may be at increased risk for a *BRCA* gene mutation [3]:

- Multiple relatives with breast cancer
- Any relatives with ovarian cancer
- Relatives diagnosed with breast cancer before age 50
- A relative with cancer in both breasts
- A relative who had both breast and ovarian cancers
- A male relative with breast cancer
- Ashkenazi Jewish ancestry (Central or Eastern European) and any relative with breast or ovarian cancer
- A relative with a known *BRCA* gene mutation
- You were diagnosed with breast cancer before age 50
- You have been diagnosed with ovarian cancer, fallopian tube cancer, or primary peritoneal (lining of the abdomen) cancer at any age
- You have been diagnosed with male breast cancer
- You have been diagnosed with triple-negative breast cancer
- You have been diagnosed with breast cancer more than once
- You have been diagnosed with both breast and ovarian cancers

How can people with a *BRCA* mutation manage their risk of cancer?

If you have a *BRCA1* or *BRCA2* gene mutation, there are ways to reduce your risk of developing cancer or to detect the cancer early. **Enhanced screening** at a younger age may increase the chances of detecting cancer at an early stage when treatment is most effective. **Prophylactic (risk-reducing) surgery** involves removing as much of the "at-risk" tissue as possible, *before* the patient is diagnosed with cancer. **Chemoprevention** is the use of drugs or other chemical agents to prevent or slow the development of cancer. [2]

If you have a *BRCA* gene mutation, you are not alone. Esperity's Online Cancer Network has thousands of members who are ready to connect and share their stories with others.

Sources

[1] http://www.cdc.gov/cancer/breast/young_women/knowbrca.htm
[2] http://www.cancer.gov/about-cancer/causes-prevention/genetics/brca-fact-sheet
[3] https://www.knowbrca.org/Learn/do-you-knowbrca