Spotlight on Health

Hereditary Breast Cancer

In the United States, over 205,000 new cases of breast cancer will be diagnosed in 2017.[1] For women in the United States, breast cancer is the leading cause of cancer and the second leading cause of cancer death.[1] But if diagnosed and treated early, certain types of breast cancer have a survival rate of 99%.[1]

Approximately 5% to 10% of breast cancer cases are hereditary.[2] Inherited variants in the *BRCA1* and *BRCA2* genes increase the risk of breast cancer and account for 20% to 25% of hereditary breast cancers.[2] Other genes associated with hereditary breast cancer include *TP53*, *PTEN*, *CDH1*, *STK11*, *PALB2*, *ATM*, *NF1*, *BARD1*, and *CHEK2*. Genetic testing can be used to identify women (and men) who are at increased risk for hereditary breast cancer. This newsletter will discuss how women can be tested for hereditary breast cancer to help assess their genetic risk.

Who Should Consider Genetic Testing

A woman who has a personal or family history of certain types of cancer should consider genetic testing. Several screening tools (ie, risk models) are available to help determine a person's chance of having a positive genetic test result. These tools include the Breast Cancer Risk Assessment Tool, the Breast Cancer Genetics Referral Screening Tool (B-RST™), and the Tyrer-Cuzick model. Patients can also take an online quiz to look for red flags in their histories that suggest a risk for hereditary cancer: Visit the QuestVantage™ website at questvantage.com/take-control.

The US Preventive Services Task Force has identified the following risk factors for women who have not already been diagnosed with cancer. The following risk factors should prompt further risk evaluation[3]:

- A family member with breast cancer before age 50
- A family member with cancer involving both breasts
- A family member with breast and ovarian cancer
- A family member with a *BRCA*-related cancer
- A male family member with breast cancer
- Multiple family members with breast cancer
- Having Ashkenazi Jewish ethnicity

Genetic Testing

Germline genetic testing can help identify patients who have an increased risk of hereditary cancer. Test results may help guide healthcare providers to make risk-reduction and treatment decisions.

Options to Reduce Breast Cancer Risk[2]

- Increased surveillance
  - Breast examinations, MRI , and mammography
- Chemoprevention
  - Medications such as tamoxifen
- Surgery
  - Prophylactic/risk-reducing mastectomy

Targeted testing has traditionally been used to test for variants in gene(s) associated with a specific condition, such as breast cancer. Next-generation sequencing now allows for simultaneous testing of large numbers of genes, which facilitates screening for multiple hereditary cancer conditions.

Genetic Counseling

For women with a family history of breast, ovarian, fallopian tube, or peritoneal cancer, genetic counseling is recommended to help determine whether the family histories suggest an increased risk for variants in breast cancer susceptibility genes. Genetic counseling should be offered to women with suggestive personal or family history, those who are high risk as determined by validated risk models, and those who have concerns about their risk for hereditary cancer.[3]

Genetic counselors can be a valuable resource for you and your patients. Genetic counselors provide the opportunity to discuss the risks, benefits, and limitations of genetic testing, while supporting informed decision-making. Additionally, genetic counselors can help patients choose the appropriate test, understand results, communicate with family members, and arrange potential follow-up testing.

How Healthcare Providers Can Help

Being on the front lines of patient care, healthcare providers have the opportunity to identify patients at risk for hereditary breast cancer. Healthcare providers can ask patients about their family and personal histories of cancer. Unfortunately, most women who meet criteria for screening have not discussed genetic testing with a healthcare provider,[4] and only 1 in 5 women who meet genetic testing criteria have actually undergone testing for hereditary cancer.[4] Appropriate screening and testing can help ensure timely interventions that can reduce the development of cancer and improve survival.[5]

How the Laboratory Can Help

Quest Diagnostics offers the BRCAvantage™ Comprehensive test, which tests for variants in the 2 high-risk genes (*BRCA1* and *BRCA2*) predominantly associated with breast cancer. Quest also offers the MyVantage™ test, which tests for variants in *BRCA1*, *BRCA2*, and 32 other genes associated with common cancers. For people of Ashkenazi Jewish decent, Quest offers the BRCAvantage™ Ashkenazi Jewish Screen for the 3 commonly found *BRCA* variants in this population.

If you have questions about which test is most appropriate for your patient or how to interpret your patient's test results, Quest offers Board-Certified Genetic Counselors who are available for consultation with healthcare providers at 1.866.GENE.INFO (1.866.436.3463) or at GeneInfo@QuestDiagnostics.com.

To refer your patient to a genetic counselor, please visit the National Society of Genetic Counselors' website (nsgc.org/findageneticcounselor). Or, you may call us at the number above and we will help you locate a genetic counselor in your area.

References

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3. US Preventive Services Task Force. Risk assessment, genetic counseling, and genetic testing for *BRCA*-related cancer in women: recommendation statement. *Am Fam Physician*. 2015;91:Online.
4. Childers CP, Childers KK, Maggard-Gibbons M, et al. National estimates of genetic testing in women with a history of breast or ovarian cancer [published online ahead of print August 18, 2017]. *J Clin Oncol*. doi:10.1200/JCO.2017.73.6314.
5. Robson ME, Bradbury AR, Arun B, et al. American Society of Clinical Oncology policy statement update: genetic and genomic testing for cancer susceptibility. *J Clin Oncol*. 2015;33:3660-3667.