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Living with the Odds
Women who carry the breast cancer gene have two fears: developing the disease themselves – and passing it onto their daughters. Recent medical research offers new answers about prevention and management.

By Lisa Bendall

Pam Bagg showed remarkable strength during her long battle with breast cancer, which began in 1998. She stayed positive and never spoke of dying. But the day she learned that her daughter, Tanya Stella, had inherited the same genetic mutation that caused the cancer, Pam broke down and cried.

“She was devastated,” remembers Tanya, 34, from her home in Prince George, B.C. “She kept saying, ‘I’m so sorry.’”

Inherited breast cancer accounts for five to 10 per cent of breast cancer cases in Canada. This gene-based disease is merciless, often striking young women particularly hard. Luckily, ongoing research is turning up new answers about prevention and management.

By the time Tanya learned of her genetic status, her aunt and great-aunt had already died of breast cancer, and her mom was fighting hard for her life. Since Pam had passed her mutated gene to her daughter, odds were that Tanya, too, would one day develop breast cancer. She would also face an elevated risk of ovarian cancer.

Pam died last year at the age of 53, but not before making Tanya promise to do whatever she could to optimize her odds of beating cancer.

Tanya had a difficult decision to make: have both breasts removed to drastically reduce her chances of eventually developing cancer (the operation is called bilateral prophylactic mastectomy), or undergo rigorous, twice-yearly screening of her breasts and ovaries, a procedure involving MRIs, mammograms, ultrasounds and Pap tests.

For now, Tanya is sticking with the screening approach, but she expects that one day she will choose to have both breasts removed. She’ll only make that decision, though, when she’s emotionally and psychically ready; choosing to lop off your still-healthy breasts is not a decision to be taken lightly. “It’s a really private, personal choice,” says Tanya.

Having to make such gut-wrenching decisions is a relatively new dilemma. It all centres on detection of a mutation in either the BRCA-1 and BRCA-2 genes (see sidebar). The discovery of these mutations in the mid-1990s was a pivotal point in breast cancer research. “Over the years, we identified a lot of families in which there seemed to be too many cases of breast cancer,” recalls Dr. Steven Narod, director of the Familial Breast Cancer Research Unit at Women’s College Research Institute in Toronto. Narod was part of the original research team that collected blood samples from these families – a huge step towards solving the genetic puzzle.

Today, many women want to know if they carry one of these genetic mutations. That's understandable since most have a friend or family member who has been diagnosed with breast cancer, or died because of it.

Fortunately, the majority of women don't carry these mutations. "In most cases, we don't know why people develop breast cancer," says Nora Wong, a genetic counsellor at Jewish General Hospital in Montreal. Having a great-aunt with the disease doesn't mean you're doomed to the same fate. Similarly, finding out you don't have a mutation is no guarantee that you will never get cancer.

But if, like Tanya, your family tree is riddled with sisters, aunts, grandmothers or a mother who developed breast cancer, you may want to talk to your doctor about whether a mutation might be lurking in your genes.

If there is cause for concern, you would undergo genetic counselling, a service available across Canada, usually with a family doctor's referral. Over the course of often several sessions, a counsellor helps you identify your risks and weigh your options, including whether or not to have the genetic test. "It's important to know what the test can or cannot help you with," says Wong. "It should not be used, for example, to allay anxiety." After all, a negative test result is no insurance that you won't get the disease anyway, and so may not ease your fears.

And while learning you're a BRCA carrier means an opportunity to reduce your risk of getting the disease – a chance to cheat fate, if you will – on the other hand, it's knowledge that carries its own burdens.

And that's where more counselling comes in – counselling that is tailored to a woman's age and individual needs, says Wong. A counsellor would not likely push ovary removal on a young, single woman but may discuss this option with a 40-year-old who already has her family. And while a woman in her 40s may need to know about surgical options, another woman in her 70s may only want guidance in telling family members about the mutation.

Sheri Ozirny, 38, of Beaumont, Alta., went through this counselling process and opted to have the genetic test in 2002. She says she wasn't surprised when she learned she was a carrier. "I cried with my husband when we found out, but I think I'd always known, in my heart." Sheri was in excellent health at the time, but breast cancer was rampant in her family. She was just 12 when her mom died, and she lost her aunt and grandmother to breast cancer. A cousin is currently sick, and three other relatives have tested positive for the mutation. Sheri's daughters, aged eight and 10, are too young to be tested, but their chances are 50-50 that they are carriers as well. (There's no pressing medical reason to test children, so it isn't generally done. But by their early 20s, they will likely have the maturity to make personal decisions based on the test results.)

Back in 2002, when she was living in Newfoundland, MRI screening wasn't available to Sheri, who currently lives near Edmonton (MRI availability varies by region) so she couldn't rely on these scans to monitor and detect a tumour. She didn't hesitate. She decided to have both breasts removed just months after learning her test results. "At the time, I didn't feel that there were any other choices," she says.

According to some experts, having healthy breasts removed may be the most appropriate preventive approach for women who carry the genetic mutation. Relying on still inexact screening and surveillance to catch a tumour in its early stages may be just too nerve-racking for some women. A mastectomy, the cost of which is covered by provincial health insurance across the country, can significantly reduce the risk of getting breast cancer (some say by at least 90 per cent) although it does not eliminate the risks completely; it's impossible to remove all breast tissue, as it's so closely connected to skin and tissue in the armpit).

The operation is preventative, so it's not the same as a mastectomy to treat cancer, says Kelly Metcalfe, a research scientist who works with Narod and at the University of Toronto. "No lymph nodes are removed, and most women have reconstruction within the same surgery."

And for women who want to alter their appearance as little as possible, they can opt for an operation that uses tissue from elsewhere on their body to create realistic nipples.

While women do have to consider their psychological attachment to their breasts and how the operation might affect delicate issues of body image and intimacy, studies show that, emotionally, women do well after these surgeries. "A lot of us women in this situation don't see a breast the way other women do, because we've seen breast cancer take our sisters and our moms," Sheri points out. "So our breasts are almost the enemy." Moreover, the operation does not affect the patient's ability to have children.

In Sheri's case, the surgery was definitely the right choice. After it was over, she got a huge shock: Cancer was already there, buried deep in the breast tissue. It was never caught on her mammogram. "I totally believe that the decision [to have a radical mastectomy] absolutely saved my life," she says.

Then, in 2003, Sheri had her ovaries removed, too. This procedure, called an oophorectomy, reduces the risk of ovarian cancer and can reduce the risk of breast cancer in premenopausal women.

Sheri is convinced she did the right thing, not only for herself but also for her children. "I lost a mom so young, and I just didn't want to put them through that. I don't want them to grow up watching their mom fight cancer."

But surgery isn't for everyone. In fact, only a quarter of Canadian women with a BCRA mutation opt for a prophylactic mastectomy. That decision may be influenced by such factors as personal experience with cancer, confidence in screening techniques, even age and culture. In contrast, 70 per cent opt to have their ovaries removed. Perhaps women consider this a less radical surgery that still reduces breast cancer risk by half. Plus, ovarian cancer is difficult to detect before it's at an advanced stage.

For those who reject the mastectomy option, for whatever reason, the drug tamoxifen can cut the cancer risk by half. The drug slows cancer growth by blocking the effects of the body's estrogen in breast tissue (although it has been proven effective only for BRCA-2 positive women).

And state-of-the-art MRI screening is now finding cancer at earlier, more treatable stages. "MRI is a very good option for someone who doesn't want to have surgery," says

Metcalfe. “Chances are, though, that these women will be called back at some point, because something will be found” on the scan.

What about lifestyle choices that can help prevent cancer? There’s an exciting, growing body of evidence suggesting some supplements may make a difference. Narod himself recommends certain dietary supplements – for example, vitamin D, diindolylmethane (DIM – a compound found naturally in broccoli and cabbage) and lycopene as well as green tea – that may boost the body’s antioxidant load or lower estrogen. This in turn helps to prevent DNA mutation, promote DNA repair and slow cancer growth. “Some dietary supplements are theoretical; we don’t have direct proof,” notes Narod, whose team is doing research in this area.

Right now, Tanya is maintaining her well-balanced diet in the hopes of curbing her cancer risks. And she’s keeping up her half-marathon training. While there’s no hard evidence that getting more exercise keeps breast cancer totally at bay, studies suggest that this and other lifestyle habits, such as cutting out alcohol, may make some difference to the average woman’s risk. If nothing else, these healthy habits have overall benefits, says Wong. “One could argue these little changes may not have a very large impact on the actual risk of developing cancer. But it helps people to cope, if they feel that they are doing what they can. If any of them happens to be diagnosed, being in a healthier place is always beneficial.” Certainly, eating well and being active pays dividends whether or not a woman is BRCA-positive.

Are other genes linked to breast cancer? Scientists have found a handful that may slightly increase the risk of breast cancer, but none is as weighty as BRCA-1 and BRCA-2. “If it was there, they would have found it,” says Narod. “The technology now [for identifying genes] is 100 times better” than ever before.

Research elsewhere continues to find promising new agents for prevention and treatment. For example, a class of drugs called PARP (Poly/ADP-Ribose Polymerase) inhibitors is attracting interest for its potential to block the repairing of cancer cells after chemotherapy or radiation therapy.

Today, Tanya doesn’t know if her 10-year-old daughter carries the BRCA mutation. But she hopes that when and if her daughter does learn her genetic status, she will never know firsthand what her older relatives suffered through. “Thinking about the new technology just since my mom was diagnosed, I know my daughter will be that much better off when she’s older,” says Tanya. She adds: “I’m really optimistic there will be a cure.”

BRCA-1 versus BRCA-2

We all have BRCA-1 and BRCA-2 genes that repair DNA and control cell division. However, in some people these genes become mutated – or defective – and may not be able to carry out this tumour suppressing function.

Having the BCRA-1 mutation sends your breast cancer risk sky high – up to an 87 per cent lifelong risk (compared to seven per cent for women in the general population). Often women with this mutation will develop the cancer at a relatively young age –

sometimes in their 30s or 40s. Having either mutation raises prostate cancer risk in men to up to 18 per cent.

However, since BRCA-1 and BRCA-2 are located on different chromosomes, their mutations carry some varied risks; for example, BRCA-2 mutations confer a lower risk of ovarian cancer (up to 25 per cent compared to up to 44 per cent for BRCA-1), a higher risk of male breast cancer and a slightly lower risk of developing cancer in a second breast.

One estimate is that BRCA-1 mutations occur in about one in every 800 people while BRCA-2 mutations are less frequent. The mutations are particularly prevelent among Ashkenazi Jews.

Children of women – and men – who carry the defective gene have a 50-50 chance of inheriting the mutation.

Partners Support

Tanya Stella, 34, of Prince George, B.C., and her husband, Edy, try not to let the topic of her BRCA positive status control their lives. “When I need to talk about it, he will listen to me,” she says. “It’s not hard for him to talk about it anymore, but it is still very scary for him.”

Finding out you have a genetic mutation that practically guarantees breast cancer in your future can be terrifying – and not just for you. A woman’s partner is often just as emotional as the carrier herself, says Nora Wong, a genetic counsellor at Jewish General Hospital in Montreal. “He doesn’t face the cancer risk himself, but still has a bond with his partner,” she says.

Tanya stresses that despite her husband’s fear, “he’s really supportive and would do anything.” That’s consistent with the findings of researcher Kelly Metcalfe, who did a study on spouses of carriers of the genetic mutations. “They really wanted their wife or partner to do whatever she could do to prevent cancer.” If that meant a mastectomy, they were on board; and if it meant removal of her ovaries, leading to the symptoms of premature menopause, they were along for the ride.

Scott, husband of cancer survivor Sheri Ozirny of Beaumont, Alta., assured her: “I’d rather have you than the breasts.” When Sheri lost her hair during chemotherapy and felt generally miserable, steadfast Scott handled the kids, the house, and her. “He made me feel totally loved,” she says.

“We had our ups and downs to get through the cancer,” says Sheri. “But it made us stronger in our marriage.”

Helpful Sources

Hereditary Breast and Ovarian Cancer (HBOC) Society of Alberta.
http://www.hbocsociety.org; (780) 488-4262. Provides help, including peer support groups, to anyone personally affected by hereditary breast and ovarian cancer.

Hereditary Breast and Ovarian Cancer Foundation.
http://www.hboc.ca; (514) 482-8174. Raises awareness and provides information about breast and ovarian cancer genes.

Pretty is What Changes: Impossible Choices, the Breast Cancer Gene, and How I Defied My Destiny **(Spiegel & Grau, 2008).** In her book, American author Jessica Queller agonizes over her options after finding out she's positive for the BRCA-1 genetic mutation.