



## Breast Cancer: Neoadjuvant Chemotherapy<sup>1</sup>

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*This is the third in a 12-part series on breast cancer. To view the rest of the titles in this series, click here.*

Neoadjuvant, or preoperative, chemotherapy is the use of chemotherapy to treat a cancerous tumor before surgery. If your doctors have suggested that you consider this treatment, you probably have questions about it. This document was written to provide answers to some of your questions. Unfortunately, as with other aspects of breast cancer, you may have more questions than anyone has answers. Recent research, however, firmly establishes neoadjuvant chemotherapy as an option for many women. It is important to remember that research currently shows that breast-cancer-free survival and survival in general are the same whether the chemotherapy is given before or after surgery.

### Overview of Chemotherapy Treatment

Chemotherapy is treatment that infuses drugs into your body to kill cancer cells. Chemotherapy can be given in several ways, but for most breast cancers, it is given intravenously. The type of medicine given depends on your tumor and your health; the frequency

of administration will depend on the type of drug. In many cases, patients get a package of two to three drugs given by vein every two or three weeks for four to eight cycles (a total of eight to twenty-four weeks).

Each cycle begins with your chemotherapy infusion, which takes about three hours. Medicines to prevent nausea ("antiemetics") and to enhance the performance of the chemotherapy drugs are given at this time. Then you go home. You may get a shot on the second day to keep your white blood cell count up and a different shot to keep your red blood cell count up. Two or three weeks later you will return for a blood test, and if your white blood cell count is high enough, you can start your next treatment. Getting the chemotherapy drugs does not hurt, and the accompanying drugs for nausea generally mean that symptoms do not appear for four to twelve hours. However, some women experience delayed nausea as long as four to five days after completion of their chemotherapy. The nausea may last for one to three days.

You probably will be sent home with a prescription for nausea medication to help reduce nausea and vomiting following treatment. Everyone reacts differently to treatment, so be sure to keep your

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physician informed about any adverse reactions that you may have. There are several American Cancer Society and National Cancer Institute publications about chemotherapy that are quite helpful. Your treatment center may provide copies of some of these before you start your treatment, or you can obtain them from your local American Cancer Society (<http://www.cancer.org/>) office.

### **Potential Side Effects of Chemotherapy**

Chemotherapy works by interrupting cell division in cells that are multiplying quickly. Since cancer cells reproduce at an abnormally fast rate, they are affected by chemotherapy. Several cycles are needed to catch more cells, since not all of them will be dividing on the day you get chemotherapy. Unfortunately, other cells in your body also reproduce quickly enough to be affected by the treatment. Hair follicles shut down, which means your hair either falls out or does not grow. The linings of the mouth, stomach, and intestines also contain cells that multiply rapidly. These cells are disrupted by chemotherapy, which can cause mouth sores, a "burned tongue" sensation, nausea, constipation, hemorrhoids, and diarrhea.

Blood production is reduced during chemotherapy because the bone marrow also is affected. This can make patients tired, due to anemia (low red blood cell counts), and more susceptible to infection, due to leukopenia (low white blood cell counts); this is why most people are given shots to keep blood production up. The cells that regenerate healthy, fast-dividing cells are not harmed as much as the cancerous cells, so as soon as the chemotherapy drugs are out of your system, you will start making more hair, mucous membranes, blood cells, etc. But there are no "master" cancer cells, so only the ones that were not killed in this treatment will be around to continue to grow after chemotherapy.

Many women report slight changes in their ability to think and remember during chemotherapy. Some women refer to this as "chemo brain," and the cause is not well understood. Family members and friends may not notice differences, but women receiving chemotherapy often recognize that their

thinking power is diminished. It may be difficult to do several things at once, perform higher-order thinking skills, or remember recent information. It is not known if these problems result from the effects of chemotherapy, the stress of having breast cancer, or a combination of factors.

Generally, these changes resolve within six months to a year after completing chemotherapy. Research shows that taking the time to engage in the things you enjoy that do not require much attention—gardening, a walk in the woods, watching birds out your window, or handicrafts—can help restore mental capacities.

Since everyone responds differently to chemotherapy, it is not possible to predict exactly how you will feel and what you will experience. Most people feel ill for a few days (as if they had the flu), and then slowly recover over the next few days. By the last week of the cycle of chemotherapy, they generally feel pretty normal.

Gentle exercise, such as walking, for twenty minutes three to four times a week has been shown to help patients tolerate their chemotherapy treatments better and receive them in a more timely manner. Exercise is also associated with reduced recurrence of breast cancer.

Any of the symptoms mentioned above can be mild or severe. They could require additional medication, and could even necessitate a hospital stay if severe enough. It is important to monitor your progress and keep in touch with the physician or other health care provider associated with your treatment.

### **Major Benefits of Neoadjuvant Chemotherapy**

Chemotherapy before surgery offers two main benefits. It is up to you to decide how much you value these benefits and what they would mean in your particular situation.

1. Neoadjuvant chemotherapy is most often done to reduce the size of the cancerous tumor. A smaller tumor may make the surgery easier. It also could make it more successful by enabling the surgeon to

take out a layer of healthy tissue around the tumor, ensuring that the entire tumor is removed. It also may enable the surgeon to take only the tumor (lumpectomy or partial mastectomy) instead of removing the whole breast (mastectomy). Keeping more of your breast means retaining much of your shape and the sensation of touch. This option is not available to everyone; it depends on the location and size of the tumor. Nevertheless, many women choose neoadjuvant chemotherapy to make the option of a lumpectomy possible.

2. Neoadjuvant chemotherapy can also tell you whether your cancer is sensitive to the particular combination of drugs that is being tried. If the tumor shrinks, you know it is responding to the drugs. If you do not choose neoadjuvant chemotherapy, there is no good way to know which chemotherapy drugs will work after the tumor is removed. Any possible remaining cells are usually microscopic, and there is no test that can tell if these cancer cells are sensitive to the chemotherapy used after surgery. Pursuing chemotherapy with the tumor present means the tumor can be measured by physical exams, mammography, or MRI (magnetic resonance imagery) to compare its size before and after treatment. Women who are interested in obtaining the most information about their disease may find this benefit important as they make sense out of their treatment. The psychological benefit of knowing that the drugs are working and the tumor is shrinking is incredibly powerful and makes future treatments more tolerable. If the finding is that the drugs did not work, the doctors have the option of changing the chemotherapy drugs being used for neoadjuvant treatment, or using different drugs for chemotherapy after surgery. Women who do not opt for neoadjuvant chemotherapy receive similar chemotherapy treatments, but will not know how sensitive their cancer is to the treatments used.

## Major Disadvantages

There also are two disadvantages of chemotherapy before surgery. Once again, it is up to you to decide how important you think they are. It depends on what you really care about and how the loss or gain relates to your particular situation.

1. The presence or absence of cancer in the lymph nodes can provide clues about whether the cancer has spread to other parts of the body. If you opt for neoadjuvant chemotherapy, and if it successfully kills your cancer cells, it may also destroy cancer cells in the lymph nodes. You will not know if you had cancer cells in the lymph nodes prior to chemotherapy. Sometimes one or two lymph nodes are removed (a "sentinel node biopsy") before neoadjuvant chemotherapy begins. This will allow you and your doctors to know if the lymph nodes had cancer *before* neoadjuvant chemotherapy treatment. However, because this involves general anesthetic and an operating room procedure (it is not done in a clinic), it is sometimes deferred until after neoadjuvant chemotherapy and done at the time of your breast surgery. If the lymph nodes are without cancer cells after neoadjuvant chemotherapy treatment, then this is a good indication that the cancer was sensitive to chemotherapy. Therefore, there may be little practical benefit to performing the sentinel lymph node biopsy prior to your final surgery. If your lymph nodes contain cancerous cells or if your tumor was very large, then you may also require radiation therapy as part of your treatment.

2. The other disadvantage is purely psychological. Neoadjuvant chemotherapy means that you live with the tumor for a few months before surgery. Some of the cancer cells are still dividing and growing while the chemotherapy is killing others. If you choose to practice imagery techniques or meditation, having the tumor still there provides a focal point, which can be helpful. But you also retain diseased tissue and live with uncertainty as to whether or not the chemotherapy is working. Not everyone wishes to keep a tumor in their body once it is detected; many women want to get rid of it as soon as possible.

## More Information to Consider

Starting your treatment with chemotherapy gives you time to learn about the treatments to come, to prepare for surgery, and to come to grips with your disease. If you like to research options before making a decision, choosing neoadjuvant chemotherapy allows you to investigate presurgery genetic testing, surgical options, and reconstruction options. It also

gives you time to learn about supportive nonmedical treatments, like herbal supplements and guided imagery techniques. Some women use genetic testing to make decisions about how aggressive their surgery should be. If you have a genetic predisposition syndrome, such as mutations of BRCA1 or BRCA2, the neoadjuvant chemotherapy can allow you time to make decisions about a second (prophylactic) mastectomy. It can also give you time to be more proactive in your care, which some women find very therapeutic.

You also will have a few more months of having two unscarred breasts. Although you may not feel like dancing every night, you will be able to wear your old swimsuit and enjoy your familiar body shape. You may want to treat yourself to whatever sensuous and feminine adventure you can think of, as it may be months before you will be able to enjoy this type of activity again.

Neoadjuvant chemotherapy does not increase the length of time of your treatment. Chemotherapy for breast cancer usually is done in four, six, or eight cycles. You can get all of your treatments before surgery or after surgery or split them into 4 + 2 or 4 + 4, depending on your situation.

When the chemicals kill cancer cells in the tumor, it does not hurt. Many women experience a small twinging sensation at the tumor site, and use this opportunity to celebrate success or focus their energy on supporting cancer cell destruction through meditation or guided imagery techniques.

Since some or all of your hair is likely to fall out in the first one or two cycles of chemotherapy, sandwiching surgery between cycles will mean that you are without hair for an additional three to four weeks (when you are waiting for, having, and healing from surgery). It will just be beginning to grow back during the hiatus from chemotherapy when you'll start another cycle. Once you lose your hair, this may all seem like a very minor problem in the scheme of things. But before you lose hair, retaining it for as long as possible may feel important to you.

There are a few relatively minor advantages of going into surgery without hair. You won't have to worry about washing your hair or shaving under your

arms—both of which could be nearly impossible for several weeks because you won't be able to lift the arm on your affected side.

## Summary

You are embarking on a lengthy medical odyssey. Some women find it helpful to gather information, research options, read the literature, ask questions, and play an active role in the decision making. The more proactive they are with their treatment, the better they feel about their care. There are many books and articles available to assist you, such as *Susan B. Love's Breast Book*. Other women find the whole process so overwhelming that they just want to have someone tell them what to do. These women especially need to have caring people with them as they make decisions about their treatment.

Both reactions are normal and acceptable. You need to follow your instincts and do what makes you most comfortable.

Choosing whether to use neoadjuvant chemotherapy is one of the first of many decisions you will make. Your doctors will give you medical advice and that may help you decide. In many cases, however, the medical advice does not clearly favor one treatment or another, especially since survival rates are similar. In such cases, you will need to determine what is important to you—having surgery right away to remove the tumor, or starting chemotherapy right away, gathering information about the sensitivity of the tumor to the drugs, and using the time to prepare for surgery. In either case you are taking steps to rid your body of cancer. There usually isn't a wrong answer, but you are not likely to have the luxury of much time to think about it. Which feels best to you?