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Understanding and Managing Chemotherapy Side Effects

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CancerCare

Learn about:

- Common side effects
- Practical information
- Improving quality of life
- Role of your health care team



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The information in this booklet is based on a Telephone Education Workshop conducted by CancerCare in collaboration with the Multinational Association of Supportive Care in Cancer (MASCC) and the Research Advocacy Network.

INTRODUCTION

page 2

- NAUSEA AND VOMITING, page 3
- FATIGUE, page 5
- MOUTH SORES (MUCOSITIS), page 6
- NERVE DAMAGE, page 7
- INFECTIONS, page 8
- DIARRHEA, page 10
- CONSTIPATION, page 12
- HAIR LOSS, page 14
- TAKING AN ACTIVE ROLE, page 14

FREQUENTLY ASKED QUESTIONS

page 17

GLOSSARY (definitions of blue boldfaced words in the text)

page 19

RESOURCES

page 20

This activity is supported by an educational donation provided by Amgen.

With better control of chemotherapy side effects, cancer treatment is going more smoothly for many patients.

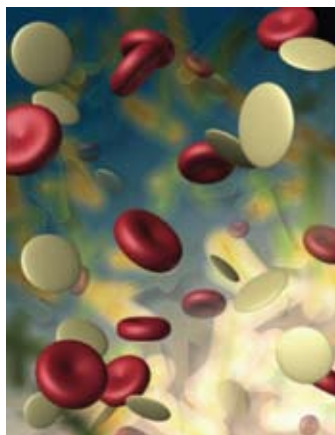
Each person with cancer reacts differently to chemotherapy and its various side effects. Fortunately, doctors now have many ways to reduce and even prevent these side effects. Also encouraging is the fact that newer types of chemotherapy cause fewer and milder side effects. In this booklet you'll find practical information on managing side effects so that your treatment goes as smoothly as possible.

Anti-Cancer Drugs

As most people with cancer already know, the goal of chemotherapy is to destroy cancer cells. These drugs are often given **intravenously**—through a vein—or in pill form, by mouth. As they wipe out fast-growing cancer cells, they can also damage fast-growing normal cells such as:

White blood cells These cells help fight infections and are an important part of our immune defense system. A low white blood cell count, called **neutropenia**, can increase the risk of infection.

Red blood cells These doughnut-



shaped iron-containing cells carry vital oxygen from the lungs to the muscles and other tissues in the body. A low red blood cell count, called **anemia**, can lead to fatigue, weakness, and difficulty breathing.

Platelets These structures in the blood help stop bleeding by plugging leaks in the blood vessels. Low levels of platelets lead to a condition known as thrombocytopenia, which can cause bruising or bleeding.

Other anti-cancer medicines can affect the cells that line mucous membranes found throughout the body—inside the mouth, throat, and stomach, for example. That can lead to mouth sores or diarrhea. And when cells in the hair root are damaged by chemotherapy, hair loss can occur.

Nausea and Vomiting

When it comes to nausea and vomiting, we know that:

- Younger people are more at risk than older people.
- Women are at a slightly greater risk than men.
- Certain drugs commonly cause these side effects, including cisplatin (Platinol), doxorubicin (Adriamycin), and cyclophosphamide (Cytoxan). Doctors have used these standard chemotherapies for many years.

Many surveys have shown that patients and their family members believe that nausea and vomiting occur with all types of chemotherapy. More than 20 years ago that was true, and it was difficult to control the symptoms. Today, doctors do a much better job of preventing and easing these symptoms. Generally, if there's more than a 10 percent risk of causing nausea or vomiting with chemotherapy, patients are given anti-nausea medicines—also known as **anti-emetics**—as a preventive.

The most common form of anti-nausea medication is a combination of dexamethasone (a type of steroid) and a

serotonin blocker—a compound that stops the natural substance serotonin from sending a message to the brain that triggers nausea. Serotonin blockers include dolasetron (Anzemet), granisetron (Kytril), ondansetron (Zofran), and palonosetron (Aloxi).



This combination helps prevent the **acute nausea and vomiting** that can occur in the first 24 hours after chemotherapy. Doctors recommend patients continue using this drug combination for two to three days following treatment to prevent **delayed nausea**. By preventing nausea, patients can also avoid anticipatory nausea—the queasy feeling that can come *before* chemotherapy.

Aprepitant (Emend) is an anti-emetic drug that can be added to the combination of dexamethasone and a serotonin blocker to protect against

Coping With Nausea

These tips can help:

- Eat and drink slowly. Try having small meals throughout the day instead of your usual breakfast, lunch, and dinner.
- Avoid sweet, fried, or fatty foods, as well as foods with strong odors. Eating foods cold or at room temperature can help you avoid strong smells.
- Be sure that you fully understand your doctor's and nurse's instructions for taking anti-nausea medicines.
- See that you have a sufficient supply of the correct drugs.
- Be sure that you are drinking enough fluids. Ask your nurse or doctor about proper nutrition during this time.
- Find out from your doctor if any other medicines you may be taking require special precautions.

both acute and delayed nausea and vomiting. Aprepitant works by counteracting the effects of a chemical produced in the body called “Substance P.”

There are many options available to help you manage this side effect. Talk with your doctor about which one is best for you. Remember, anti-nausea medicines are given to *prevent* the problem from occurring.

Fatigue

Feeling tired—really tired—can be tied to a number of factors:

- The cancer itself
- Treatment of the disease
- The emotional aspects of dealing with cancer and cancer pain
- Anemia (low levels of red blood cells)

If you are experiencing fatigue, you should know that this is a symptom for which you *can and should* seek help. If your doctor doesn’t ask you about fatigue, be sure to bring it up. That’s the best way to find and treat the cause.

To determine whether there is an underlying physical cause, your doctor will order a blood test to find out if your red

Dealing With Fatigue

These tips can help you reduce your fatigue:

- Take several short naps or breaks in a comfortable chair rather than in bed.
- Take short walks or do some light exercise if possible.
- Try easier or shorter versions of the activities you enjoy.
- Ask your family or friends to help you with tasks you find difficult or taxing.
- Save your energy for things you find most important.

blood cell count is abnormally low (anemic). He or she may then prescribe darbepoetin alfa (Aranesp) or epoetin alfa (Procrit). These medicines, which are approved for treating chemotherapy-induced anemia, boost oxygen-carrying red blood cells in your blood.

Oncology social workers and oncology nurses can also help you manage fatigue. They can work with you to address any psychological concerns that may be causing symptoms and help you develop practical strategies for coping.

Don't try to treat yourself with over-the-counter medicines for "iron-poor blood." These drugs have not proved to be helpful.

Mouth Sores (Mucositis)

Sores inside the mouth and on the mucous lining of the throat and digestive tract can result from radiation treatments and from some types of chemotherapy. **Mucositis** can be a serious problem because it can cause pain and infections, making it difficult to eat, drink, and swallow. Once treatment ends, mouth sores do disappear. But before they fade, it's important that you work closely with your health care team to manage this side effect of cancer treatment. Here are some of the most important steps:

Visit your dentist before treatment.

A small problem could turn into a large one if mouth sores develop later on.

Take care of your mouth and keep it clean.

- Use the softest bristle brush.
- If toothpaste irritates your mouth, use a mixture of ½ teaspoon salt with 4 cups water.



- Gargling may help. Use a solution made up of:

1 quart plain water
 ½ teaspoon table salt
 ½ teaspoon baking soda

Drink plenty of fluids.

Soothe mouth sore pain with:

- Ice chips or Popsicles.
- Ibuprofen (such as Motrin) or acetaminophen (such as Tylenol) for mild pain.
- Over-the-counter anesthetics, such as Anbesol or Orajel. Let your doctor know if you are using them, especially if he or she prescribes a lidocaine-based mouthwash.
- Gelclair—an oral gel designed to coat and soothe mouth sores by forming a protective barrier in the mouth. Available by prescription only.

If you are receiving high-dose chemotherapy followed by bone marrow transplant for a blood cancer, the drug palifermin (Kepivance) may be prescribed. Palifermin, given intravenously, has been shown to protect the lining of the mouth, reducing severe mucositis. The safety and effectiveness of this drug for people with other types of cancer are not yet known.

Don't resist taking stronger drugs for severe pain, such as **opiates**, a class of drugs that includes morphine. Pain causes stress, which can affect your quality of life and even slow progress toward better health. Severe pain can be treated with intravenous drugs if swallowing pills is difficult. And when your pain is controlled, you will be better able to eat and drink fluids.

Nerve Damage

Some people on chemotherapy experience numbness or tingling in their hands and feet, what doctors call peripheral

neuropathy. Symptoms related to neuropathy and other types of nerve damage can include:

- Difficulty picking up objects or buttoning clothing
- Problems with balance
- Difficulty walking
- Jaw pain
- Hearing loss

These symptoms can build over time. Some people don't notice them until they have had several chemotherapy treatments. It's important to tell your doctor as soon as possible if you experience these types of side effects. He or she may want to adjust some of your medicines or chemotherapy and may want to see if there is another reason for the problem that can be treated.

Often, nerve damage is temporary; it will usually get better, but it can take time. That's because the nerve fibers re-grow very slowly—less than a millimeter ($1/25$ of an inch) per day. In the meantime, take extra caution when handling hot, sharp, or dangerous objects. And use handrails on stairs and in the tub or shower.

Infections

As we mentioned earlier, chemotherapy can lower the levels of infection-fighting white blood cells, a condition known as neutropenia. Of special concern for cancer patients are **neutrophils**, the most abundant of the three types of white blood cells. These cells contain tiny packets filled with potent chemicals called enzymes that can destroy bacteria when the chemicals are released.

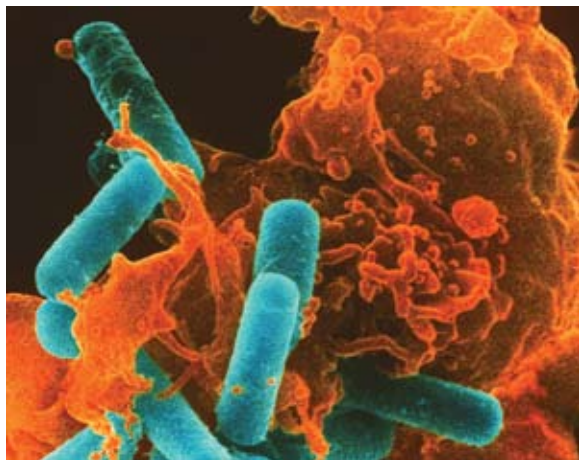
Bacteria are the most common source of infection for patients receiving chemotherapy. The normal number of white blood cells in one microliter of blood (a tiny droplet, one millionth of a liter) is between 4,000 and 11,000; the

risk of infection is greatest when the neutrophil count drops to 1,000 or fewer.

If your neutrophil count dips below this number, the only symptoms you might experience are chills, fever, or sweats. If you are feeling unwell *in any way* after receiving chemotherapy, it's vital to take your temperature.

Temperatures from 99°F (37.2°C) to 100°F (37.8°C) are fairly common. ***But if your temperature rises to 100.5°F (38.1°C) or above, call your doctor or nurse immediately.***

Fever may be your only sign of an infection. Unless fever is treated promptly, infections can become life-threatening. Make sure you have a good thermometer (the digital ones are fine) that is easy to use and read. Also, be sure to have your doctor's telephone number in case there is a problem.



Photograph made through an electron microscope showing a neutrophil (orange) attaching to and consuming bacteria (blue, rod-shaped cells) to protect the body against infection. The neutrophil then uses potent enzymes to destroy the bacteria.

Dr. Karl Lounatmaa / Photo Researchers, Inc.

Doctors use antibiotics to treat infections. Although most people think of antibiotics as pills, intravenous antibiotics are often recommended for patients receiving chemotherapy. Using intravenous antibiotics knocks out infections until the white blood cell count returns to normal.

Depending on a number of things, including the type of

Preventing Infections

You can lower your risk of infection by taking these simple steps:

- Wash your hands frequently with soap and water, especially after using the toilet and before eating.
- Clean cuts and scrapes right away. Use an antiseptic and keep wounds clean and dry until they heal.
- Carry an alcohol-based product, such as Purell, with you in case you don't have access to soap and water.
- Be careful not to nick or cut yourself when using a razor, knife, or scissors.
- Wear protective gloves when gardening or cleaning up.
- Avoid contact with cat litter boxes, bird cages, and fish tanks.

chemotherapy you receive, another approach is to take white blood cell **growth factors**. In some patients, these medicines can reduce the risk of getting infections. Growth factors stimulate the bone marrow to replenish blood cells affected by chemotherapy.

Commonly used white blood cell growth factors include filgrastim (Neupogen) and pegfilgrastim (Neulasta). Both of these drugs have to be given by injection. Your doctor or nurse can train you or a caregiver to administer this injection at home if you prefer. Pegfilgrastim may be given just once, a day or two after chemotherapy.

Diarrhea

Defined as two or more loose stools per day, diarrhea may be caused by some types of chemotherapy, including irinotecan (Camptosar), 5-fluorouracil (5-FU), erlotinib (Tarceva), and gefitinib (Iressa). If diarrhea persists, especially in large and frequent stools, you should report it to your doctor or nurse. There are also some things you can do to help control diarrhea:

Replace lost fluids and salts.

- Drink plenty of fluids. If you are getting behind in fluids, make sure that your doctor or nurse knows about the problem you are having with diarrhea.
- Increase your intake of drinks such as Gatorade or Pedialyte, an over-the-counter solution made for infants but can be used by adults as well. These drinks provide electrolytes—the body’s salts that must stay in balance in order for cells to work properly. Occasionally, intravenous fluids are needed if the diarrhea is especially severe.

Change your diet

Many foods can nourish you without contributing to diarrhea. Here are some suggestions:

CHOOSE	INSTEAD OF
High-protein foods such as eggs (well cooked); lean meat, fish, or poultry; smooth peanut butter*; beans*	Fried or fatty foods (such as sausage, bacon, chicken nuggets, or fried seafood), pizza
Skim or low-fat milk, yogurt, cottage cheese (use lactose-free dairy products if you are lactose intolerant)	Regular milk or cheese with more than 9 grams of fat per ounce
Cooked vegetables* such as carrots, green beans, mushrooms	Raw vegetables, especially those with thick skins, seeds, or stringy fibers
Fresh fruits without the skin, canned fruit (except prunes)	Dried fruits
Desserts low in fat and lactose such as sorbets, fruit ices, graham crackers	High-fat ice creams; any candies, gum, or breath mints containing sorbitol, mannitol, or xylitol

Note: Foods marked with an asterisk are high in soluble fiber, which solidifies stool but contributes to the amount of stool. Choose them when the volume of stool is manageable.

Take medicine, but only if you need it. Options include:

- **Over-the-counter medicines** Use these medicines *only* if necessary. Discuss their proper use with your health care team. The most recommended over-the-counter medicine for diarrhea is Imodium AD. But you should remember that this used to be a prescription medicine and can be quite powerful. In general, if the diarrhea is bad enough for you to need a medicine, including an over-the-counter one, you should discuss the diarrhea and treatment with your doctor or nurse.
- **Prescription drugs** Your doctor may need to prescribe something stronger, such as diphenoxylate and atropine (Lomotil). Like all drugs, these products can interact with other drugs you may be taking, such as opiate pain relievers. If your doctor prescribes Lomotil, be sure to tell him or her about any existing conditions you may have, such as heart disease or breathing or thyroid problems; taking this drug can make these problems worse.

For severe, unrelenting diarrhea that does not respond to these oral medications, your doctor may consider giving you injections of octreotide (Sandostatin). Although this drug has not been approved specifically for diarrhea caused by chemotherapy or radiation treatments, your doctor may prescribe it “off label.”

Constipation

Defined as fewer than three bowel movements a week (although fewer than four or five may be a reduced number for some people), this symptom can be caused by:

- Vinorelbine (Navelbine), vincristine (Oncovin and others), and temozolomide (Temodar), commonly used chemotherapy drugs
- Inactivity

Avoiding Constipation

Here are some things you can do to help prevent constipation:

- Eat plenty of dietary fiber: grains, beans, and vegetables such as cauliflower or broccoli.
- Drink plenty of fluids.
- Make light exercise a part of your everyday schedule.

- Low fluid intake
- Low intake of dietary fiber
- Anti-nausea medications
- Opiate pain medications

Oddly enough, even in cases of severe constipation, liquid can seep around a blockage, which some patients mistake for diarrhea. They may take an antidiarrheal medication, making the problem worse. With prolonged constipation, other symptoms, such as confusion and retaining urine, can occur.

So it's very important to use only gentle, stimulating laxatives if you're constipated. Stool softeners such as docusate sodium (Colace), although helpful, are not enough. Pharmacies carry a number of different laxatives that are available without a prescription such as Senokot, bisacodyl (Dulcolax), magnesium hydroxide (milk of magnesia), or Metamucil. A prescription-only powder laxative called MiraLAX can also help.

The best thing to do is to *prevent* constipation through diet, exercise, and *careful* use of laxatives. Prescription pain medicines may be one of the biggest reasons people with cancer experience constipation. But your doctor can prescribe a special schedule of laxatives along with your pain medication so that you can still benefit from pain relief and avoid constipation.

Hair Loss

Not all anti-cancer medicines cause hair loss; your doctor or nurse can tell you whether you might be affected. But hair loss is one of the more trying aspects of cancer treatment for many people. When hair falls out, it affects self-image and quality of life. But there are ways you can boost your



self-confidence with an educated attitude and advance preparation.

Everyone's experience is different, so it's important to talk with your doctor or nurse about how your particular treatment affects hair loss. Depending on the treatment, hair loss may start anywhere from seven to 21 days after the first chemotherapy session. Hair starts to grow back after you are finished

with treatment. It may have a different texture or color, but these changes are usually not permanent.

Generally, when most people lose their hair, they want to wear some kind of head covering, whether it's a scarf, turban, hat, or wig. Some insurance plans cover part of the cost. Organizations such as CancerCare® can also provide suggestions for obtaining a wig.

Taking an Active Role

The more involved you are with your health care team, the more control you will have over many of the symptoms described in this booklet. Taking an active role is important, not only for your comfort but for your safety as well. The more information you communicate with your doctors and nurses about how you are feeling, the more they can help you to achieve the best quality of life. Don't hesitate to ask questions so you can get the help you need.

Good communication with your health care team is especially important if you decide to take part in a clinical trial. These studies are the gold standard by which we measure the worth of new treatments and patients' quality of life as they go through these treatments. Your doctor can guide you in making a decision about whether a clinical trial is right for you.

YOUR SUPPORT TEAM

When you or a loved one is diagnosed with cancer, it's common for many emotions and issues to arise. Sometimes it helps to talk to someone. Just getting your concerns out into the open so you can make sense of them helps make them seem more manageable.

It's perfectly normal to feel sad, angry, afraid, or frustrated about the side effects of chemotherapy. If you are experiencing fatigue or nausea, for example, you may not be able to do all the things you're used to doing. Your family may feel the effects too. Perhaps you have a young child at home who doesn't understand why you're lacking the energy to play. Or maybe you need your loved ones to pitch in more with household chores. You may also need some accommodations made for you at work—a place where you can go to rest or more flexible hours.



Social workers and oncology nurses can help. These health care professionals provide emotional support, help you cope with your treatment and its side effects, and guide you to resources and practical solutions for problems. CancerCare® offers free individual counseling online, on the

phone, and in person with oncology social workers on staff. Financial assistance is also available to help offset the cost of transportation to treatment, child care, or home care while you're receiving treatment.

Join a support group. You and your family members may benefit from a support group, which can ease the feeling that you are going through treatment side effects alone. By providing reassurance and sharing insight and suggestions, people in support groups often help each other learn new ways to cope. CancerCare offers free telephone and online support groups for people living with cancer, caregivers, and loved ones. These groups are led by professional oncology social workers.

To learn more about how CancerCare helps, call us at 1-800-813-HOPE (4673) or visit www.cancercare.org

Frequently Asked Questions

Q I've had some nerve damage as a side effect of my treatment. Should my doctor consider changing the type of chemotherapy I'm getting?

A This is a judgment call. You and your doctor have to weigh the risks and benefits of your treatment. The decision will depend on how severe your symptoms are, where you are in the course of your treatment, how responsive your tumor has been to chemotherapy, the current goals of treatment, and whether there are effective drugs that do not cause nerve damage that could be substituted. However, even if you stop using a medicine today, you will probably continue to experience some symptoms.

Because nerve damage is cumulative, the symptoms may get worse before they get better. Talk with your doctor or nurse about medications, as well as techniques such as acupuncture, which can help ease discomfort.

Q I haven't experienced many side effects from my chemotherapy, so I'm wondering whether my treatment is really working.

A You're not alone in thinking that. Sometimes, people can have a great benefit from chemotherapy without having a lot of side effects or even *any* side effects. An important goal is to prevent side effects, and it sounds as though you and your doctors have been able to do that.

Q When a patient has a low white blood cell count—**neutropenia**—what is the most common organism that causes infections, and what antibiotics are used?

A There are many different organisms that can cause infection. That is why a broad-spectrum antibiotic is usually prescribed to treat infection. Doctors see different patterns of infection in different geographic regions. These patterns affect which medicines are given to treat infections and prevent them from becoming worse.

Q There have been many discussions in my support group and on the Internet about the side effect referred to as “chemobrain.” What is “chemobrain” and what can be done about it?

A If you are experiencing problems with memory, focusing on tasks, finding words, or managing daily activities, you are not alone. Patients often notice these changes during chemotherapy treatment. But most people find that within a year of finishing treatment, these symptoms have either greatly improved or disappeared altogether.

Researchers are still uncertain about the exact causes of “chemobrain.” But a number of conditions that may lead to the symptoms can be treated effectively: low blood cell counts, depression, anxiety, and fatigue among them. Tell your doctor if you’re having any of the symptoms of “chemobrain.” Sometimes, simply changing a prescription can make a real difference in how you feel, since some medications can also make you less alert.

Glossary

acute nausea and vomiting Symptoms that may occur within the first 24 hours after chemotherapy.

anemia A low red blood cell count that can lead to fatigue, weakness, and difficulty breathing.

anti-emetics Medicines that act against nausea and vomiting.

delayed nausea A side effect of chemotherapy that may occur two to three days after treatment.

growth factor A drug that stimulates the bone marrow to make blood cells, in this case, the white blood cells affected by chemotherapy. Commonly used white blood cell growth factors are filgrastim (Neupogen) and pegfilgrastim (Neulasta).

intravenously Fluid—in this case, chemotherapy—delivered through a needle into a vein. This form of treatment is referred to as IV, or intravenous.

mucositis Sores inside the mouth and on the mucous lining of the throat and digestive tract that can result from some types of radiation treatments and chemotherapy.

neutropenia A low white blood cell count that can increase the risk of infection.

neutrophils The most abundant of the three types of infection-fighting white blood cells. Neutrophils contain tiny packets filled with potent chemicals called enzymes that can destroy bacteria when the chemicals are released.

opiates A class of drugs that includes morphine for effective pain relief.

serotonin A natural chemical messenger that has many important functions in the body, including stimulating movement in the intestines. When released by certain chemotherapy drugs, serotonin can send a signal to the brain that triggers nausea.

Resources

CancerCare

1-800-813-HOPE (4673)
www.cancer.org

American Cancer Society

1-800-277-2345
www.cancer.org

Cancer.Net

Patient information from the American Society of Clinical Oncology
www.cancer.net

National Cancer Institute

Cancer Information Service
1-800-422-6237
www.cancer.gov



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The information presented in this patient booklet is provided for your general information only. It is not intended as medical advice and should not be relied upon as a substitute for consultations with qualified health professionals who are aware of your specific situation. We encourage you to take information and questions back to your individual health care provider as a way of creating a dialogue and partnership about your cancer and your treatment.

All people depicted in the photographs in this booklet are models and are used for illustrative purposes only.

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