



Surgery

Surgery is the oldest form of cancer treatment. It also plays a key role in diagnosing cancer and finding out how far it has spread (a process is called *staging*). Advances in surgical techniques have allowed surgeons to operate on a growing number of patients and have good outcomes.

When a surgeon has to cut into the body to operate, it's called *invasive surgery*. Today, operations that involve less cutting and damage to nearby organs and tissues (less invasive surgery) often can be done to remove tumors while saving as much normal tissue and function as possible.

Surgery offers the greatest chance for cure for many types of cancer, especially those that have not spread to other parts of the body. Most people with cancer will have some type of surgery.

How is surgery used for cancer?

Surgery can be done for many reasons. Some types of surgery are very minor and may be called *procedures*, while others are much bigger operations. The more common types of cancer surgeries are listed here.

Preventive (prophylactic) surgery

Preventive surgery is done to remove body tissue that is likely to become cancer, even though there are no signs of cancer at the time of the surgery. For example, pre-cancerous polyps may be removed from the colon.

Sometimes preventive surgery is used to remove an entire organ when a person has an inherited condition that puts them at a much higher risk for having cancer some day. For example, some women with a strong family history of breast cancer are found to have a change (mutation) in the DNA of a breast cancer gene (*BRCA1* or *BRCA2*). Because their risk of getting breast cancer is high, these women may want to consider prophylactic mastectomy. This means the breasts are removed before cancer is found.

Diagnostic surgery

This type of surgery is used to take out a piece of tissue (biopsy) to find out if cancer is present or what type of cancer it is. The diagnosis of cancer is made by looking at the cells under a microscope. There are many ways to get a sample of cells from an area that looks like it may be cancer. These are described in more detail in the section called “Surgery to diagnose and stage cancer.”

Staging surgery

Staging surgery is done to find out how much cancer there is and how far it has spread. The physical exam and the results of lab and imaging tests are used to figure out the *clinical stage* of the cancer. But the *surgical stage* (also called the *pathologic stage*) is usually a more exact measure of how far the cancer has spread. To learn more about this, please see our information on *Staging*. It can be read online at www.cancer.org, or call 1-800-227-2345 to have a copy sent to you.

Examples of surgical procedures commonly used to stage cancers, like laparotomy and laparoscopy, are described in the section, “Surgery to diagnose and stage cancer.”

Curative surgery

Curative surgery is done when cancer is found in only one area, and it’s likely that all of the cancer can be removed. In this case, curative surgery can be the main treatment. It may be used alone or along with chemotherapy or radiation therapy, which can be given before or after the operation. Sometimes radiation therapy is actually used during an operation. (This is called *intraoperative* radiation therapy.)

Debulking (cytoreductive) surgery

Debulking surgery is done to remove some, but not all, of the cancer. It is done when removing all of the cancerous tumor would cause too much damage to an organ or nearby tissues. In these cases, the doctor may take out as much of the tumor as possible and then try to treat what’s left with radiation or chemotherapy. Debulking surgery is commonly used for advanced cancer of the ovary and some lymphomas.

Palliative surgery

This type of surgery is used to treat problems caused by advanced cancer. It is not done to cure the cancer. Palliative surgery can also be used to correct a problem that’s causing discomfort or disability. For example, some cancers in the belly (abdomen) may grow large enough to block off (obstruct) the intestine. If this happens, surgery can be used to remove the blockage. Palliative surgery may also be used to treat pain when the pain is hard to control by other means.

Supportive surgery

Supportive surgery is done to help with other types of treatment. For example, a vascular access device such as a Port-A-Cath[®] or Infusaport[®] can be surgically placed into a large vein. The port can then be used to give treatments and draw blood, instead of putting needles in the arms.

Restorative (reconstructive) surgery

This type of surgery is used to improve the way a person looks after major cancer surgery, or to restore the function of an organ or body part after surgery. Examples include breast reconstruction after mastectomy or the use of tissue flaps, bone grafts, or prosthetic (metal or plastic) materials after surgery for head and neck cancers. For more information on these types of reconstructive surgeries, you can read *Breast Reconstruction After Mastectomy* and *Oral Cavity and Oropharyngeal Cancer*. They can be read online or you can get a copy by calling our toll-free number.

Surgery to diagnose and stage cancer

A *biopsy* is a procedure done to remove tissue (called a sample) from an area that may be cancer. A doctor looks at the sample under a microscope to see if there are cancer cells in it. Some biopsies may need to be done during surgery. But many types of biopsies are done by removing small pieces of tumor through a thin needle or through a flexible lighted tube called an *endoscope*. Biopsies are often done by surgeons, but they can be done by other doctors, too. Some of the more common ways to do a biopsy are described here.

Fine needle aspiration biopsy

Fine needle aspiration (FNA) uses a very thin needle attached to a syringe to pull out small bits of tissue. If the tumor can't be felt near the surface of the body, the needle can be guided into the tumor by looking at it using an imaging test, like an ultrasound or CT scan.

The main advantage of FNA is that there is no need to cut through the skin, so there is no surgical incision (in-**sih**-zhun). A drawback is that in some cases the needle can't take out enough tissue for an exact diagnosis. A more invasive type of biopsy (one that involves larger needles or a cut in the skin) may then be needed.

Core needle biopsy

This type of biopsy uses a larger needle to take out a core of tissue. A core biopsy sample can be removed with a needle if the tumor can be felt at the surface. Core biopsies can also be guided by imaging tests if the tumor is too deep to be felt.

The advantage of core biopsy is that it usually collects enough tissue to find out whether the tumor is cancer.

Excisional or incisional biopsy

For these biopsies a surgeon cuts through the skin to remove the entire tumor (*excisional biopsy*) or a small part of the tumor (*incisional biopsy*). They can often be done with local or regional anesthesia. This means numbing drugs are used just in the area where the biopsy will be done. If the tumor is inside the chest or belly (abdomen), drugs that put you into a deep sleep and keep you from feeling pain (general anesthesia) may be needed.

Endoscopy

This procedure uses a long, thin, flexible tube with a viewing lens or a video camera and a fiber optic light on the end. If a video camera is used, it's connected to a TV screen. This allows the doctor to clearly see any tumors in the area. Endoscopes (**end**-uh-scopes) can be passed through natural body openings to look at areas of concern in places such as those listed below. Any of these procedures can be called an endoscopy (end-**ah**-skuh pee), but the more specific name is given as well:

- Pharynx (throat) – pharyngoscopy (**fair**-in-**GAH**-skuh-pee)
- Larynx (voice box) – laryngoscopy (**lair**-in-**GAH**-skuh-pee)
- Esophagus (swallowing tube) – esophagoscopy (eh-**sof**-uh-**GAH**-skuh-pee)
- Stomach – gastroscopy (gas-**trah**-skuh-pee)
- Small intestine – duodenoscopy (due-**odd**-en-**AH**-skuh-pee)
- Colon (large intestine) – colonoscopy (**ko**-lun-**AH**-skuh-pee)
- Sigmoid colon (lower part of colon) – sigmoidoscopy (**sig**-moid-**AH**-skuh-pee)
- Bladder – cystoscopy (sis-**TAH**-skuh-pee)
- Respiratory tract (windpipe, smaller breathing tubes, and lungs) – bronchoscopy (brong-**kah**-skuh-pee)

Some of the advantages of endoscopy are:

- The doctor can look right at the tumor and get a good idea of where it is and how big it is.
- A sample of tissue can be taken through the scope to find out if the tumor is cancer.
- An open surgical cut (incision) and drugs to put you in a deep sleep (general anesthesia) are usually not needed.

Local numbing medicines are needed before some types of endoscopy. Medicines may also be given to make you relax or go into a light sleep.

Ultrasonography

Ultrasound devices can be attached to the end of some endoscopes. This allows doctors to make pictures of the layers of the swallowing tube (esophagus), main breathing tubes (trachea and bronchi), and parts of the bowel (large intestine) by using sound waves. Nearby lymph nodes can be seen, too. Using the ultrasound pictures to guide it, a needle can be put through the endoscope and cells can be taken from tissues that do not look normal.

Laparoscopy, thoracoscopy, or mediastinoscopy

Laparoscopy (**lap**-uh-**RAHS**-kuh-pee) is much like endoscopy, but a small cut (incision) is made in the skin of the belly (abdomen). A thin tube called a laparoscope (**LAP**-uh-ruh-**scope**) is then put through the cut and into the belly to look for areas that may be cancer. If any are seen, they can be biopsied using a needle that is put in through the laparoscope. General anesthesia is most often used for laparoscopy (you are given drugs to put you into a deep sleep while it is done).

When this type of procedure is done to look inside the chest it may be called a thoracoscopy (tuh-**rahs**-kuh-pee) or mediastinoscopy (**me**-dee-uh-stine-**AH**-skuh-pee). General anesthesia is also used for this procedure. The scope is put in the body through a small cut next to or above the top of the breastbone, or a small cut between the ribs. Biopsies are taken through the scope.

Open surgical exploration (laparotomy or thoracotomy)

A laparotomy (**lap**-uh-**ROT**-uh-mee) may be needed when easier, less invasive explorations do not give enough information about an area of concern in the belly (abdomen). In this procedure, a surgeon makes a cut (incision), usually from the bottom of the breastbone (sternum) down to the lower part of the belly to look directly at the area in question. The location and size of the tumor and the nearby areas can be seen, and biopsies can be taken. This is a major surgical procedure, so the patient is given medicines to cause a deep sleep and prevent pain (general anesthesia).

An operation much like this can be done to open and look inside the chest. This is called a thoracotomy (**thor**-uh-**KOT**-uh-me).

Special surgery techniques

When most people think of surgery, they picture a doctor using a scalpel and other surgical instruments to cut into and remove, repair, or replace parts of the body affected by disease. But newer techniques, using different types of instruments, have expanded the concept of what surgery is. Some of these techniques are described here.

Laser surgery

A laser is a highly focused and powerful beam of light energy which can be used for very precise surgical work, such as repairing a damaged retina in the eye. It can be used instead of a blade or scalpel to cut through tissue. It can also be used to vaporize (burn and destroy) some cancers of the cervix, voice box (larynx), liver, lung, rectum, or skin.

Some laser surgeries can involve less cutting and damage (be made less invasive). For instance, with fiber optics and special scopes the laser can be directed inside a natural body opening without having to make a large cut (incision). The laser is then precisely aimed to destroy the tumor. See “Endoscopy” in the section “Surgery to diagnose and stage cancer.”

Lasers are also used in a type of surgery called *photoablation* (**foe**-toe-uh-**BLAY**-shun) or *photocoagulation* (**foe**-toe-ko-**ag**-you-**LAY**-shun). This means lasers are used to destroy tissue or to seal tissues or vessels. This type of surgery is often used to relieve symptoms, such as when large tumors block the windpipe (trachea) or swallowing tube (esophagus), causing problems breathing or eating.

You can learn more about lasers in our document called *Lasers in Cancer Treatment*.

Cryosurgery

Cryosurgery (**cry**-o-**SUR**-juh-ree) uses a liquid nitrogen spray or a very cold probe to freeze and kill abnormal cells. This technique is sometimes used to treat pre-cancerous conditions, like those affecting the skin, cervix, and penis. Cryosurgery is also used to treat some cancers, like those of the liver and prostate. A scan (like an ultrasound or CT scan) is used to guide the probe into the cancer and watch the freezing of the cells. This limits damage to nearby healthy tissue.

Electrosurgery

High-frequency electrical current can be used to destroy cells. It is used for some cancers of the skin and mouth.

Mohs surgery

Mohs micrographic surgery, also called *microscopically controlled surgery*, is used to remove certain skin cancers by shaving off one thin layer at a time. After each layer is removed, a doctor looks at the tissue layer under a microscope. When all the cells look normal under the microscope, the surgeon stops removing layers of tissue.

Mohs surgery is used when the extent of the cancer is not known or when as much healthy tissue as possible needs to be saved, like cancers around the eye. It is done by a specially trained surgeon after the skin to be treated is numbed (under local anesthesia).

Chemosurgery is an older name for this type of surgery and refers to certain drugs that may be put on the tissue before it's removed. Mohs surgery does not involve use of chemotherapy drugs.

Laparoscopic surgery

A laparoscope (**LAP**-uh-ruh-**scope**) is a long, thin, flexible tube that can be put through a small cut (incision) to look inside the body. It is sometimes used to take pieces of tissue (biopsy samples) to check for cancer. In recent years, doctors have found that by creating small holes and using special instruments, the laparoscope can be used to perform surgery without making a large cut. This can help reduce blood loss during surgery and pain afterward. It can also shorten hospital stays and allow people to heal faster. Laparoscopic (**lap**-uh-ruh-**SKAH**-pick) surgery is used commonly today to remove gallbladders and repair hernias.

The role of laparoscopic surgery in cancer treatment is not yet clear. Doctors are now studying whether it is safe and effective to use laparoscopic surgeries for cancers of the bladder, colon, rectum, liver, prostate, and kidney, among others. It may prove to be as safe and work as well as standard surgery while cutting less and causing less damage to healthy tissues (being less invasive). Some studies have hinted at this being the case. But larger, long-term studies still need to be done.

Thorascopic (thor-uh-**skah**-pick) surgery

A thoracoscope (thor-**AH**-kuh-**scope**) is a narrow, rigid tube with a camera on the end that can be put through a small cut (incision) into the chest after the lung is collapsed. This allows the doctor to see inside the chest. Tissue samples of any areas of concern on the lining of the chest wall can be taken out (biopsied), fluid can be drained, and small tumors on the surface of the lung can be removed.

This type of surgery leads to less cutting and has even been used to remove parts (lobes) of the lung that contain cancer. Studies have shown that for early stage lung cancer, results using this approach are much the same as removing part of the lung through a cut in the side of the chest. (When the chest is cut open it is called a thoracotomy (**thor**-uh-**KAH**-tuh-me); see the above section.)

Other forms of surgery

Doctors are always looking for new ways to remove or destroy cancer cells. Some of these methods are blurring the line between what we commonly think of as surgery and other forms of treatment. Researchers are testing many new techniques, using things like high intensity focused ultrasound; microwaves or radio waves (radiofrequency ablation, or RFA); and even high-powered magnets to try to get rid of unwanted tissue. These techniques are promising but are still largely experimental.

As doctors have learned how to better control the energy waves used in radiation therapy, some newer radiation techniques that work almost as well as surgery have been found.

By using radiation sources from different angles, stereotactic radiation therapy delivers a large precise radiation dose to a small tumor area. The process is so exact that this is sometimes called *stereotactic surgery*, even though no cut is actually made. In fact, the machines used to deliver this treatment have names like Gamma Knife and CyberKnife, but no knife is involved. The brain is the most common site that is treated using this technique, but it is also used on head, neck, lung, and spine tumors. Researchers are looking for ways to use it to treat other types of cancer, too.

Questions to ask your doctor about surgery

Before having surgery, find out all you can about the benefits, risks, and side effects of the operation. You may want to ask your doctor the questions listed here. The answers may help you feel better about your decision.

- Why am I having this operation? What are the chances of its success?
- Is there any other way to treat the cancer?
- Other than the cancer, am I healthy enough to go through the stress of surgery and the drugs used to do it (anesthesia)?
- Are you certified by the American Board of Surgery and/or Specialty Surgery Board?
- How many operations like this have you done? What is your success rate? Are you experienced in operating on my kind of cancer?
- Exactly what will you be doing in this operation? What will you be taking out? Why?
- How long will the surgery take?
- Will I need blood transfusions?
- What can I expect afterwards? Will I be in a lot of pain? Will I have drains or catheters? How long will I need to be in the hospital?
- How will my body be affected by the surgery? Will it work or look different? Will any of the effects be permanent?
- How long will it take for me to go back to my usual activities?
- What are the possible risks and side effects of this operation? What is the risk of death or disability?
- What will happen if I choose not to have the operation?
- What are the chances that the surgery will cure my cancer?
- Do I have time to think about my options or get a second opinion?

Getting a second opinion

One of the ways to find out whether a suggested operation is the best choice for you may be to get the opinion of another surgeon. Your doctor should not mind this. In fact, some health insurance companies make you get a second opinion. You may not need to have tests done again because you can often bring the results of your original tests to the second doctor.

Check with your insurance company before planning surgery and before getting a second opinion. Get all of the information you need to feel sure you are making the right choice for your situation. Making an informed decision about your health is almost always better than making a quick one.

What will surgery be like?

Your surgery experience depends on many things, including the disease being treated, the type of operation being done, and your overall health. There are probably as many different surgical techniques as there are diseases to treat, so each case is different.

It's not possible to get into the specifics of each type of operation here. If you would like more detail, you can find it in the treatment sections of our documents on specific types of cancer. Call us at 1-800-227-2345 or go to our Web site, www.cancer.org, to get this information.

Still, some parts of the surgical experience happen in almost all types of operations. They include pre-operative testing and preparation, the surgery itself (usually including some type of drugs to get you through the surgery), and a recovery period.

Planning and preparation

Both you and your doctor have things to do before surgery to make sure you have the best chance for a good outcome. As much as is possible, you need to know what to expect and be comfortable that the decision you've made is the best one for you. People differ about how involved they want to be in the decision-making process. But knowing as much as you can about what lies ahead can, at the very least, help reduce your stress level.

It's not unusual for patients to wait a few weeks after learning they have cancer to have surgery. You have time – time to learn more about your cancer, time to talk to others who have been through it, time to explore your treatment options, time to organize your thoughts, and time to find the right health care team for you. You also may want a second opinion. Insurance pre-approval for the surgery may be needed and this, too, takes time. In almost all cases, the time needed to prepare for surgery should have no impact on the success of the surgery. But if you do have some type of urgent medical problem, surgery will be done as soon as possible.

Informed consent

Informed consent is one of the most important parts of getting ready for surgery. It is a process during which you are told about all aspects of the treatment before you give your doctor written permission to do the surgery. The details may vary from state to state, but the informed consent form usually says that your doctor has explained these things:

- Your condition and why surgery is an option
- The goal of the surgery
- How the surgery is to be done
- How it may benefit you
- What your risks are
- What side effects to expect
- What other treatment options you have

When you sign the consent form you are saying that you have received this information and you are willing to have the surgery. It's important that you read the consent form and understand each of the above issues before signing it. Make sure your doctor answers all of your questions and that you understand the answers. Having a family member or friend go over it with you may also be helpful.

Please see our document called *Informed Consent* if you would like to learn more about this process.

Pre-operative testing

In most cases, you will need many tests in the days or weeks before your surgery, especially if a major operation is planned. These tests are done to make sure your body is able to go through surgery and the drugs that will be used. They may also be done to help doctors better understand your condition and help them plan the surgery. You may not need all of the tests listed here (especially if you are having a minor procedure in a doctor's office). But the tests most often used include:

- **Blood tests** to measure your blood counts, your risk of bleeding or infection, and how well your liver and kidneys are working. Your blood type may also be checked in case you need blood transfusions during the operation.
- **Urine test** (urinalysis) to look at kidney function and check for infections.
- **Chest x-ray** and **EKG** (electrocardiogram) to check your lungs and your heart's electrical system.
- Other tests will be done as needed, such as CT scans to look at the size and location of the tumors and see if the cancer looks like it has spread to nearby tissues.

Your doctor will also ask you questions about high blood pressure, heart disease, diabetes, alcohol and tobacco use, and other things that could affect surgery. Your doctor should know about all the medicines you take, including vitamins, herbs, and even the drugs you take every now and then. It's also important that you let your doctor know about any allergic reactions you've had in the past, including reactions to foods or other substances.

Your surgeon may change some of the medicines you take and ask you to stop smoking, stop drinking alcohol, try to improve your diet, lose weight, or actively exercise before surgery.

If you are going to be given drugs to put you into a deep sleep (have general anesthesia), you will probably also see a doctor who specializes in giving anesthesia, called an *anesthesiologist* (**an-es-thee-zee-AHL**-uh-jist). Other specialists may be consulted or other tests done if you have any other problems that could affect the surgery.

Getting ready for surgery

Depending on the type of operation you have, there may be things you need to do to be ready for surgery.

Emptying your stomach and bowels (digestive tract) is important if you'll be given drugs to make you sleep during surgery (anesthesia). Vomiting while under anesthesia can be very dangerous because the vomit could get into your lungs and cause an infection. Because of this, you will be asked to not eat or drink anything starting the night before the surgery. You may also be asked to use a laxative or an enema to make sure your bowels are empty.

You may need to have an area of your body shaved to keep hair from getting into the surgical cut (incision). The area will be cleaned before the operation to reduce the risk of infection. Other special preparations may be needed, too.

It is normal to be anxious about surgery and anesthesia. Let your doctors know about these fears. They may give you medicine to help you relax before surgery.

The operation

Again, although each type of surgical procedure is different, they usually have certain things in common.

Anesthesia

Anesthesia is the use of drugs to make the body unable to feel pain for a period of time. Depending on the type and extent of the operation, you may get drugs to make you sleep, too. In some cases, you may have an option as to which type of anesthesia you prefer.

- *Local anesthesia* is often used for minor surgeries, such as biopsies near the body surface. A needle is used to put medicine into the site beforehand. This numbs the

nerves that cause pain. You stay awake and usually feel only pressure during the procedure.

- *Topical anesthesia* is a type of local anesthesia that is rubbed or sprayed onto a body surface instead of being put in with a needle (injected). It is sometimes used to numb the throat before a scope is passed down to the stomach or lungs (endoscopy).
- *Regional anesthesia (a nerve block)* numbs a larger area of the body while still allowing you to stay awake. A needle is used to put medicine into an area around the spinal cord, which affects certain nerves coming out of it. But a nerve block may also mean injecting medicine around nerves in the arms or legs. The location of the injection determines the area affected. Medicine may be given as a single injection or as an ongoing infusion. You do stay awake, but you may be given something to help you relax.
- *General anesthesia* puts you into a deep sleep for the surgery. It is often started by having you breathe into a face mask or by putting a drug into a vein in your arm. Once you are asleep, an endotracheal (**en-doe-TRAKE-ee-ul**) or ET tube is put in your throat to make it easy for you to breathe. Your heart rate, breathing rate, and blood pressure (vital signs) will be closely watched during the surgery. A doctor or nurse who specializes in giving anesthesia watches you throughout the procedure and until you wake up. They also take out the ET tube when the operation is over.

Recovery

From anesthesia

If you had local anesthesia, you may be allowed to go home shortly after the surgery. People who get regional or general anesthesia are taken to the recovery room to be watched closely while the effects of the drugs wear off. This may take hours. People waking up from general anesthesia often feel “out of it” for some time. Things may seem hazy or dream-like for a while, and you may not feel like you are fully awake until the next day.

Your recovery right after surgery depends on many factors, including your state of health before the operation and how extensive the operation was. You will get pain medicine while in the hospital, and will be given a prescription for pain medicine to take at home if you need it. Throughout your hospital stay, be aware that there are many different medicines available to help you control your pain. If you are in pain and it’s holding up your recovery, be sure to let your health care team know.

Your throat may be sore for a while from the endotracheal (ET) tube. You may also have a tube (called a Foley catheter) draining urine from your bladder into a bag. This may be taken out soon after surgery, but may need to be put back in if you have trouble passing urine on your own.

Drains

You may have a tube or tubes (called *drains*) coming out of the surgical opening in your skin (incision site). Drains allow the excess fluid that collects at the surgery site to leave the body. Your doctor will probably take them out once they stop collecting fluid, usually a few days after the operation. This may be done while you are still in the hospital or later at the doctor's office.

Eating and drinking

You may not feel much like eating or drinking, but this is an important part of the recovery process. Your health care team may start you out with ice chips or clear liquids. They will check that you are passing urine normally and may want to measure the amount of urine you make by having you go in a special container.

The stomach and intestines (digestive tract) is one of the last parts of the body to recover from the drugs used during surgery. You will need to have signs of stomach and bowel activity before you will be allowed to eat. Along with checking your surgical wound and other parts of your body, your doctor will listen for bowel sounds in your belly and will ask if you have passed gas. These are signs that your bowel is starting to work normally again. You will likely be on a clear liquid diet until this happens. Once it does, you may get to try solid foods.

Activity

Your health care team will probably try to have you move around as soon as possible after surgery. They may even have you out of bed and walking the same day. While this may be hard at first, it helps speed your recovery by getting your digestive tract moving. It also helps your circulation and helps prevent blood clots from forming in your legs. Again, be sure to let your team know if you are having a lot of pain, so they can give you medicine to control it.

Your team may also encourage you to do deep breathing exercises. This helps fully inflate your lungs and reduces the risk of pneumonia.

Going home

Once you are eating and walking, you may start hearing about plans for going home. Of course, this will depend upon other factors too, such as the results of the surgery and tests done afterward. Your doctor will want to make sure you are well enough to be home. Before leaving, be sure that you understand the following:

- How you will care for your wound at home
- What to look for that might need attention right away
- What your activity limits are (driving, working, lifting, etc.)

- Other restrictions (diet, those related to pain medicine, etc.)
- What medicines to take and how often to take them, including pain medicines
- Who to call with questions or problems that may come up
- Whether you should be doing anything in terms of rehabilitation (exercises or physical therapy)
- When you need to see your doctor again

You may need help at home for a while after surgery. If family members or friends are unable to do all that is needed, your health care team may be able to arrange to have a nurse or nurse's aide visit you at home for a short while.

Other parts of recovery may take longer. Wounds heal at different rates in different people. Some operations, like a breast removal (mastectomy), may lead to permanent changes in your body. Others, such as a having an arm or leg removed (limb amputation) or an opening in your belly connected to the end of your intestine (an ostomy) might affect how your body works, and you may need to learn new ways of doing things.

Fully understanding the result of the operation before it is done is an important part of helping you adjust to the changes that have been made to your body. Be sure that all of your questions are answered up front. Get as specific as you need to with your questions, and make sure your health care team gives specific answers, too.

What are the risks and side effects of surgery?

There are risks that go with any type of medical procedure and surgery is no exception. Success partly depends on the type of surgery you are having and the surgeon's experience with it. The patient's physical health affects the process and outcome a great deal too. What's important is whether the expected benefits outweigh the possible risks.

Doctors have been performing surgeries for a very long time. Advances in surgical techniques and our understanding of how to prevent infections have made modern surgery safer and less likely to damage healthy tissues than it has ever been. Still, there's always a degree of risk involved, no matter how small.

Before you decide to have any medical procedure done, it's important that you understand the risks. Different procedures have different kinds of risks and side effects. This section cannot list all of the possible problems (complications) of every type of surgery. Be sure to discuss the details of your case with your doctor, who can give you a better idea about what your actual risks are.

During surgery

Possible complications during surgery may be caused by the surgery itself, the drugs used (anesthesia), or an underlying disease. Generally speaking, the more complex the surgery is the greater the risk.

Minor operations and tissue samples (biopsies) usually pose less risk than major surgery. Pain at the site of the cut (incision) is the most common problem. Infections at the site and reactions to the drugs used to numb the area being treated (local anesthesia) are also possible.

Complications in major surgical procedures are not common, but can include:

- Bleeding during surgery that may cause you to need blood transfusions. There is a risk of certain problems with transfusions, some of them serious. Doctors try to minimize this risk by checking your blood counts beforehand and being careful when working near blood vessels. Still, some operations involve a certain amount of controlled blood loss. If you have concerns about needing a blood transfusion, talk to your doctor before surgery. You may be able to save (bank) some of your own blood in the weeks before surgery so it can be given back to you during the operation if needed. This is called *autologous transfusion* (aw-**tahl**-uh-gus trans-**few**-zhun). For more information, see *Blood Product Donation and Transfusion*, which you can read online or get by calling our toll-free number.
- Damage to internal organs and blood vessels during surgery. Again, doctors are careful to allow as little damage as possible.
- Reactions to drugs used (anesthesia) or other medicines. Although rare, these can be serious because they can cause dangerously low blood pressures. Your doctors will watch your heart rate, breathing rate, blood pressure, and other signs throughout the procedure to look for this.
- Problems with other organs, such as the lungs, heart, or kidneys. These problems are very rare but can happen and can be life-threatening. They are more likely to happen to people who already have problems with these organs. This is why doctors get a complete medical history to look for possible risks before an operation is done.

After surgery

Some problems after surgery are fairly common, but are not usually life-threatening.

- Pain is probably the most common side effect. Almost everyone has some level of pain after surgery. Some pain is normal, but it should not be allowed to slow down your recovery. There are many ways to deal with surgical pain. Medicines for pain range from aspirin and acetaminophen (Tylenol[®]) to stronger drugs, like codeine and morphine.
- Infection at the site of the wound is another possible problem. Doctors take great care to reduce this risk by cleaning the area and keeping the area around it sterile, but

infections do happen. Antibiotics, either as a pill or given through a vein in your arm (IV), are able to treat most infections.

Other problems are rare, but may be more serious.

- A lung infection (pneumonia) can occur, especially in patients with reduced lung function, such as smokers. Doing deep breathing exercises as soon as possible after surgery helps lessen this risk.
- Other infections can develop within the body, especially if the stomach or intestines were opened during the operation. Doctors take great care to try to prevent this. But if it happens, antibiotics will be needed.
- Bleeding can happen either inside the body (internally) or outside the body (externally). It can occur if a blood vessel was not sealed off during surgery or if a wound opens up. Serious bleeding may cause the person to need another operation to find the source of the bleeding and stop it.
- Blood clots can form in the deep veins of the legs after surgery, especially if a person stays in bed for a long time. Such a clot can become a serious problem if it breaks loose and travels to another part of the body, such as a lung. This is a big reason why you will be encouraged to get out of bed to sit, stand, and walk as soon as possible.
- Slow recovery of other body functions, such as activity in the bowels, can sometimes become serious problems, too. Getting out of bed and walking around as soon as possible after surgery can decrease this risk.

Other life-threatening complications are very rare and hard to predict, but sometimes do happen. Your surgical team will take many steps to reduce the risk of complications. This includes things like shaving and cleaning the area before cutting the skin to avoid infection, use of special leg pumps and low-dose blood thinners to avoid clots, and breathing treatments (respiratory therapy) to help prevent pneumonia.

Long-term side effects depend on the type of surgery done. For example, people who have colorectal cancer surgery may need an opening in the belly to which the end of the colon is attached (a colostomy). Men having their prostate removed (radical prostatectomy) are at risk for losing control of their urine (incontinence) or becoming unable to get or keep an erection (impotent). Your doctor should talk to you about all of these long-term outcomes before surgery. You can get more information on long-term effects by calling the American Cancer Society at 1-800-227-2345.

Does surgery cause cancer to spread?

In nearly all cases, surgery does not cause cancer to spread, but there are some important exceptions. Doctors who have a lot of experience in taking biopsies and treating cancer with surgery are very careful to avoid these situations.

The chances that using a small needle to remove a piece of the tissue (needle biopsy) may cause a cancer to spread are very low. In the past, larger needles were used for biopsies, and the chance of spread was higher.

Most types of cancers can be safely sampled by an incisional biopsy, where the surgeon cuts through the skin to remove a small part of the tumor. But there are a few exceptions, such as certain tumors in the eyes or in the testicles. For these types of cancer, doctors may treat without looking at a piece of the tumor (biopsy) or may recommend removing the entire tumor if it is likely to be cancer. In some cases a needle biopsy can be safely used, and then if the tumor is found to be cancer, the whole tumor is removed by surgery.

One common myth about cancer is that it will spread if it is exposed to air during surgery. Some people may believe this because they often feel worse after surgery than they did before. But it is normal to feel this way when beginning to recover from any surgery. Another reason people may believe this is because during surgery the doctor may find more cancer than was expected from scans and x-rays. This can happen, but it is not because of the surgery – the cancer was already there – it just didn't show up on the tests that were done. Cancer does not spread because it has been exposed to air. If you delay or refuse surgery because of this myth, then you may be harming yourself by passing up effective treatment.

Some things to remember

The best chance of a cure from many types of cancer is to remove all of the cancer as soon as possible after diagnosis. If you have a solid tumor, sometimes surgery alone will cure the cancer, but you might need chemotherapy, radiation therapy, or other treatment, too. Your health care team will discuss your best treatment options with you.

If you have any concerns about surgery or cancer spread, discuss this issue with the people who know your situation best – your surgeon and other members of your cancer care team.

You can also call 1-800-227-2345 any time you have questions or need help. The American Cancer Society has information, resources, and support available on cancer-related topics.

To learn more

More information from your American Cancer Society

The following related information may also be helpful to you. Free copies of these materials may be ordered from our toll-free number, 1-800-227-2345, or they can be read online at www.cancer.org.

After Diagnosis: A Guide for Patients and Families (also available in Spanish)

What Is Cancer? (also available in Spanish)

Staging

Informed Consent (also available in Spanish)

Blood Product Donation and Transfusion

Lasers in Cancer Treatment

Talking With Your Doctor (also available in Spanish)

Choosing a Doctor and a Hospital (also available in Spanish)

Health Professionals Associated With Cancer Care

Questions People Ask About Cancer (also available in Spanish)

Helping Children When a Family Member Has Cancer: Dealing With Diagnosis (also available in Spanish)

Helping Children When a Family Member Has Cancer: Dealing With Treatment (also available in Spanish)

National organizations and Web sites*

Along with the American Cancer Society, other sources of information and support include:

American College of Surgeons (ACoS)

Web site: www.facs.org

Patient education Web site, "Patients as Partners in Surgical Care," helps surgical patients and their families learn about operations and surgical care; it can be found at: www.facs.org/patienteducation

National Cancer Institute

Toll-free number: 1-800-4-CANCER (1-800-422-6237)

Web site: www.cancer.gov

Provides accurate, up-to-date information on many cancer-related topics to patients, their families, and the general public

**Inclusion on this list does not imply endorsement by the American Cancer Society.*

No matter who you are, we can help. Contact us anytime, day or night, for cancer-related information and support. Call us at **1-800-227-2345** or visit www.cancer.org.

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For additional assistance please contact your American Cancer Society
1 · 800 · ACS-2345 or www.cancer.org