

Bladder Cancer

Bladder cancer is the 5th most common cancer in the United States. Over 79,000 people will be diagnosed in the United States with bladder cancer in 2016. Bladder cancer is more common in males than females. Three times more men than women tend to get this disease.

Bladder cancer is more common as a person grows older. It is found most often in the age group of 75-84. More Caucasians than any other ethnicities seem to develop bladder cancer. However, there are more African-Americans who do not survive the disease.

What is Cancer?

Cancer is when your cells in your body grow out of control. Cancer starts in one organ and most cancers form a lump called a tumor. Some cancers grow and spread quickly to other parts of the body. Others grow more slowly. Bladder cancer tends to grow quickly.

What is Bladder Cancer?

The bladder is where the body stores urine before it leaves the body. The bladder is a hollow and round organ with flexible, muscular walls and a lining within the bladder called the Urothelium or Transitional Cell Layer of the bladder.

The bladder can get bigger or smaller as it fills with urine. Urine is carried to the bladder through tubes called ureters. When you go to the bathroom, the muscles in your bladder will contract, pushing urine out through the urethra.

Bladder cancer usually starts in the transitional cell layer, the lining of the bladder. Most often it will grow as a polyp, or papillary form. Some tumors grow along the surface as carcinoma-in-situ or as a sessile tumor. As tumors grow, they invade the layers of the bladder beneath the lining urothelial cells, the lamina propria and the bladder muscle cells beneath. Bladder cancer may spread to lymph nodes nearby and others farther away. The cancer may reach the bones, the lungs, or the liver and other parts of the body.

What are the Symptoms of Bladder Cancer?

The most common symptom is blood in the urine. The blood can be visible (red or brown color) but can also be microscopic and found incidentally. If you see blood in your urine you should be **evaluated**. Blood in the urine does not always mean that you have bladder cancer. There are a number of reasons why you may have blood in your urine. You may have an infection or kidney stones. A very small amount of blood might be normal in some people.

Frequency of urination, urgency of urination, pain with urination and abdominal or lower back pain all can be signs of bladder cancer.

What Causes Bladder Cancer?

You are more likely to get bladder cancer if you smoke or breathe in tobacco smoke. Smoking tobacco may be the cause of half of all bladder tumors. If you smoke, you are more likely to get bladder cancer than those who have stopped smoking.

There also are some risks related to genes and certain types of infections. Another known risk factor is a type of radiation beam aimed at the pelvis. Patients with other cancers, such as lymphomas and leukemia, who receive treatment with the drug cyclophosphamide, may be at a higher risk for bladder cancer.

Some exposure in the workplace may put you at a greater risk for bladder cancer. Contact with chemicals used to make plastics, paints, textiles, leather and rubber may cause bladder cancer.

How is Bladder Cancer Diagnosed?

Your healthcare provider will first perform a full medical history and physical exam. He/she may refer you to a urologist for more tests and to form a diagnosis. If your diagnosis is bladder cancer, additional tests will find out the stage of your disease. It will also give your doctor an idea of what treatment is best for you. Some of these tests are described here.

Tests for Bladder Cancer

The following tests most likely will be done:

Cytology: The color and content of your urine will be checked. This test will also look at body cells under a microscope to test for cancer cells.

Blood tests: A comprehensive metabolic panel (CMP), which includes kidney and liver function tests will be among the blood tests your doctor will order.

A Computerized tomography scan (also known as CT or CAT scans)

Cystoscopy: A doctor will use a thin tube that has a light and camera at the end of it (cystoscope) to pass through the urethra into the bladder. It allows your doctor to see inside the bladder cavity. Usually your doctor will use a flexible cystoscope and a local anesthetic for your exam in the office. The doctor will take a tissue sample with a cystoscope in the operating room. Taking the tissue at this time will allow your doctor to look at the cells. The tissue sample will be sent to a laboratory where they will find out the stage of your cancer. This will help with choosing the right treatment.

Rigid cystoscopy: The scope that the doctor uses when you are put to sleep is not flexible like the one used in the office, but rigid. This means that it is straight and does not bend. This cystoscope is bigger, has a light at the end, and surgical instruments can pass through it. This allows for more extensive work like the transurethral resection of bladder tumor (TURBT) described below.

Diagnosis of bladder cancer is confirmed when the doctor sees the tumor through a cystoscope and during transurethral resection of a bladder tumor (TURBT) described below. You will likely be put to sleep for these exams. At this time your doctor will stage your cancer and try to cut it away. They will also see whether the cancer has spread.

Transurethral resection of bladder tumor (TURBT). This is a very important procedure for accurate tumor typing, staging and grading. Your doctor can look inside the bladder, take tumor samples and resect (cut away) what he/she sees of your tumor.

Blue light cystoscopy. For this test, your doctor uses a catheter to place an imaging solution into your bladder through your urethra. The solution is left in the bladder for about an hour. The doctor then uses the cystoscope to inspect the bladder with regular white light and then with blue light. The bladder cancer cells show up better with blue light.

Imaging tests. CT scans, MRI scans and PET scans. These tests help diagnose and stage bladder cancer.

What are the Grades and Stages of Non-muscle Invasive Bladder Cancer?

Grade and stage are two important ways to measure and describe how cancer develops. A tumor grade tells how aggressive the cancer cells are. A tumor stage tells how much the cancer has spread.

Tumor Grade

Grading is one of the ways to know if the disease will come back. It also tells us how quickly the cancer may grow and/or spread.

Tumors can be low or high grade. High-grade tumor cells are very abnormal, poorly organized and tend to be more serious. They are the most aggressive type.

Tumor Stage

The tumor stage tells how much of the tissue has the cancer. Doctors can tell the grade and stage of bladder cancer by taking a small sample of the tumor. This is called a biopsy. A pathologist in a lab examines the sample under a microscope and determines the grade and stage of the cancer.

The stages of bladder cancer are:

- Ta: Tumor on the bladder lining that does not enter any layers of the bladder
- Tis: Carcinoma in situ (CIS)-A high-grade cancer but "flat" cancer. It looks like a reddish, velvety patch on the bladder lining
- T1: Tumor goes through the bladder lining, into the second layer, but does not reach the muscle layer
- T2 : Tumor grows into the muscle layer of the bladder
- T3: Tumor goes past the muscle layer into tissue surrounding the bladder, usually fat surrounding the bladder
- T4: Tumor has spread to nearby structures of the bladder such as the prostate in men or the vagina in females

What Does NMIBC Look Like?

Bladder cancer is described by how far into the wall of the bladder the cancer has grown (which is the clinical stage). Non-muscle invasive bladder cancers are found in the inner layer cells of the bladder. These cancers do not invade the muscular wall. These tumors are staged from Ta (lowest stage) to T1 (highest stage for NMIBC).

Over half of patients with low-grade Ta cancers will have a tumor recurrence. About 6% will progress to a higher stage. High-grade T1 cancers recur at a rate of about 45% and 17% of these will probably progress to a higher stage.

Once diagnosed, the rates of survival are quite favorable for patients with NMIBC. Survival in high-grade disease ranges from about 70-85% at 10 years and a much higher rate for low-grade disease. However, it is important that the disease is diagnosed early. This helps doctors predict the course of the disease and choose the best treatment to stop it from growing.

How is Non-muscle Invasive Bladder Cancer Treated?

Options and Choices for Treatment

Treatments for non-muscle invasive bladder cancer include:

- Cystoscopic resection of the tumor
- Intravesical immunotherapy
- Intravesical chemotherapy

If these options fail to treat your cancer, your doctor may recommend removing the complete bladder.

Cystoscopy with Bladder Tumor Resection

During a tumor resection, your doctor will remove any cancer cells that can be seen at transurethral resection of bladder tumor (TURBT).

TURBT

Transurethral resection of bladder tumor (TURBT) is usually done under anesthesia. The surgery is done during cystoscopy, so there is no cutting into the abdomen. You will be given general or spinal anesthesia.

A rigid cystoscope is what your doctor will use for this procedure. This scope is straight and does not bend. It has a light at the end and is bigger and allows surgical instruments to pass through it. Your doctor is able to see inside the bladder, take tumor samples and resect (cut away) the tumor.

If a tumor is clearly seen, the doctor will attempt to remove it all. The doctor may also remove very small samples of other areas of the bladder that may look abnormal. These samples will also be checked for grade and stage. You may be left with a Foley catheter in your bladder after this procedure to allow your bladder to heal.

You may need to have your tumor resected more than once. During your follow-up examinations your doctor will check to make sure all the cancer is removed.

Intravesical Therapy

What to expect from Intravesical Therapy

Intravesical ("within the bladder") therapy, is when a treatment drug is put directly into your bladder. The drug is put into the bladder with the help of a catheter (a thin tube that is placed through the urethra). You will hold the drug in your bladder for one to two hours and then pass it out. Intravesical chemotherapy is usually given immediately after surgery.

Intravesical Immunotherapy

Immunotherapy is a treatment that boosts the ability of your immune system to fight the cancer. Bacillus Calmette-Guerin (BCG) is the immunotherapy drug that is used for bladder cancer. BCG also has been used as a tuberculosis vaccine.

Your BCG therapy will probably last about six weeks for the first course. It is usually done in your doctor's office, not in the hospital or operating room. You may get BCG treatment more than once.

The BCG drug is inserted into the bladder through a catheter. The therapy triggers the immune system to attack bladder cancer cells. It is one of the most effective treatments for bladder

cancer, especially carcinoma in situ (CIS). It is not recommended if you have a weak immune system or certain symptoms. Side effects can include:

- Urinating often
- Pain when urinating
- Flu-like symptoms
- Joint pain
- Fever or chills
- Bacteria infecting whole body (less common)

Intravesical Chemotherapy

Intravesical chemotherapy is usually given immediately after surgery. With intravesical chemotherapy, drugs that are known to kill cancer cells are placed directly into the bladder, not in the bloodstream. As a result, many common side effects of chemotherapy - like hair loss - can be avoided. Because the drugs only reach the bladder lining, this type of treatment is only recommended for NMIBC.

Mitomycin C is the most common chemotherapy drug used for intravesical therapy. It is usually given after the initial TURBT. It helps stop cancer cells from going to another place and growing. It also reduces the recurrence rates. It can also be given as a six-week induction course similar to BCG. Common side effects include:

- The need to urinate often
- Painful urination
- Flu-like symptoms
- Skin rash

Repeat Intravesical Therapy

Some patients may respond to repeat therapy if the cancer returns. If you have high-grade Ta or T1 cancer or CIS, or you tried BCG and it did not work, you may need something else to control the cancer. In this case, you should talk to your doctor about surgery to remove the bladder.

Maintenance Intravesical Therapy

After the bladder is free of disease, your doctor may suggest more treatment with the same drugs to keep the tumor from coming back. This may happen at the first three-month appointment after treatment.

Maintenance therapy is a good choice for people who have had BCG, less so for those who have had chemotherapy drugs. It is given for up to three years after treatment, and generally about every six months for three weeks at a time.

Your doctor will talk to you about whether you are a candidate for maintenance therapy. He/she will also talk about whether intravesical chemotherapy or BCG are good options for you.

How is Muscle Invasive Bladder Cancer Treated?

When the cancer is a stage 2 or higher cancer then tumor has invaded into the bladder muscle or beyond. These types of cancers are much harder to treat and need more aggressive treatment.

Removing the bladder

Surgery to Remove the Bladder

Radical Cystectomy is removal of the entire bladder, along with the prostate in the males and anterior vaginal tissue in the female. This surgery is advised for muscle invasive tumors but is being recommended more and more for tumors that are high-grade T1, T1+CIS (carcinoma in situ) and T1+LVI (lymphovascular invasion)

Partial Cystectomy (removal of part of the bladder)

Partial cystectomy is a good choice for some patients if the tumor is located in a specific part of the bladder and does not involve more than one spot in the bladder. The surgeon removes the tumor, the part of the bladder containing the tumor, and nearby lymph nodes. After part of the bladder is removed, you may not be able to hold as much urine in your bladder as before surgery. You may need to empty your bladder more often.

Radical Cystectomy (removal of the whole bladder)

The surgeon removes the entire bladder, nearby lymph nodes, and part of the urethra. In men, he/she may remove the prostate as well. In women, the surgeon may remove the uterus, ovaries, fallopian tubes, and part of the vagina. Other nearby tissues may also be removed.

Urinary diversion after bladder removal

When your bladder is removed or partly removed, your urine will be stored and made to leave your body by a different route. This is called **urinary diversion**. If you have a radical cystectomy, you will need to know about urinary diversion options.

Because the surgeon uses tissue from your intestines for bladder reconstruction, you must have sufficient bowel tissue for them to create your urinary diversion method. Before this is done, your surgeon will explain the procedure to you so that you can understand what will be done and the adjustments you will need to make. Here are some of the urinary diversion options your surgeon may offer:

- **Ileal conduit:** To make an ileal conduit, the surgeon will take a piece of your upper intestine and use it to create an opening (stoma) on the surface of your abdomen. The ureters are connected so that the urine leaves your body by the opening. A bag will be attached to collect the urine, and you will empty the bag several times a day. This is the easiest, and most commonly used diversion after bladder surgery.
- **Continent cutaneous reservoir:** Your surgeon creates a pouch inside your body, and you will learn to use a catheter to remove the urine.
- **Orthotopic neobladder:** Your surgeon creates an internal pouch, much like your bladder, to store urine. Your ureters are connected to this new "bladder" and you are able to empty through your urethra the same way you did before the surgery. In some instances, you may need to use a catheter to remove the urine.

Talk with your doctor about your options for a urinary diversion. Having a urinary diversion will greatly impact your quality of life.

Bladder Sparing Procedures

Some patients with muscle invasive bladder cancer will be candidates for bladder sparing techniques that combine deep resection of the tumor along with chemotherapy and radiation to the bladder at the location of the tumor. You will need to review this carefully with your providers.