

What is Non-muscle Invasive Bladder Cancer?

Non-muscle invasive bladder cancer (NMIBC) is cancer found in the tissue that lines the inner surface of the bladder. The bladder muscle is not involved.

Bladder cancer is the 5th most common cancer in the United States. Nearly 82,000 people will be diagnosed in the United States with bladder cancer in 2018. 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 body cells grow out of control. When this happens the body cannot work the way it should. Most cancers form a lump called a tumor or a growth. Some cancers grow and spread fast. Others grow more slowly. Not all lumps are cancers. Cancerous lumps are sometimes called malignant tumors.

What is Bladder Cancer?

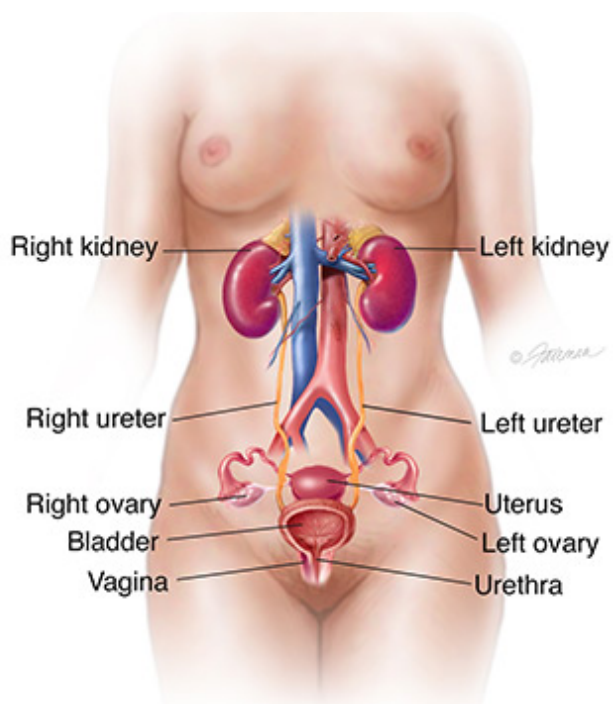
The bladder is where the body stores urine before it leaves the body. Urine is what we call the liquid waste made by the kidneys. The bladder is a hollow organ in the pelvis with flexible, muscular walls. The bladder can get bigger or smaller as it fills with urine. Urine is carried to the bladder through tubes called ureters. When you go to the bathroom, the muscles in your bladder will contract. They then push urine out through a tube called the urethra.

When cells of the bladder grow abnormally, they can become bladder cancer. A person with bladder cancer will have one or more tumors in his/her bladder.

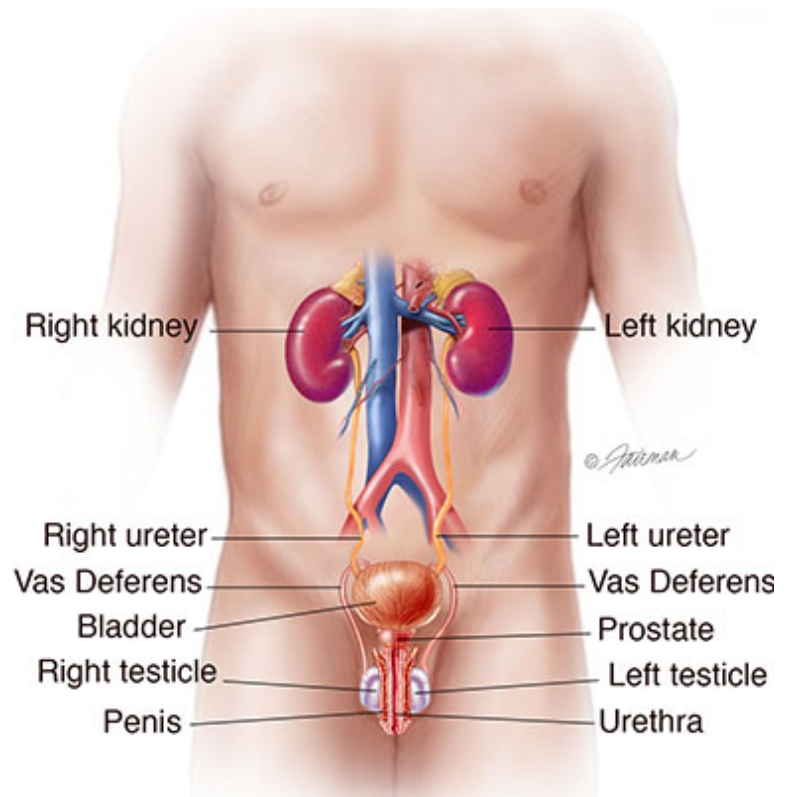
How Does Bladder Cancer Develop and Spread?

The bladder wall has many layers, made up of different types of cells. Most bladder cancers start in the urothelium or transitional epithelium. This is the inside lining of the bladder. Transitional cell carcinoma is cancer that forms in the cells of the urothelium.

Bladder cancer gets worse when it grows into or through other layers of the bladder wall. Over time, the cancer may grow outside the bladder into tissues close by. 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. With NMIBC, the tumor will not have spread outside the bladder.



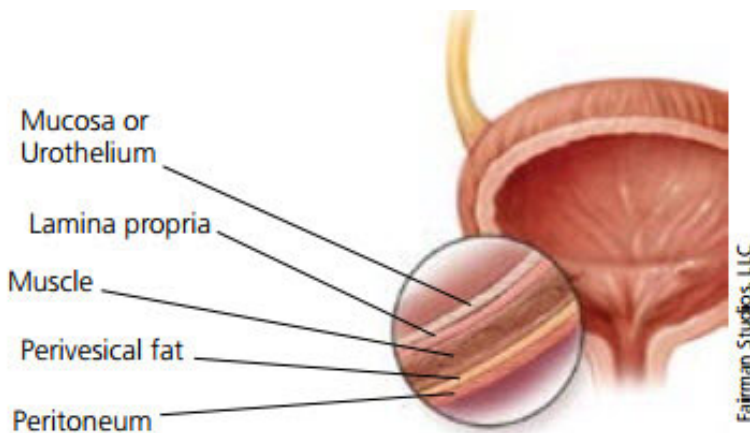
Female urinary tract



Male urinary tract

Layers of the bladder

Image © 2003 Fairman Studios, LLC



What are the Symptoms of Bladder Cancer?

How do you know that you may have bladder cancer? Some people may have symptoms that suggest they have bladder cancer. Others may feel nothing at all. Some symptoms should never be ignored. You may need to talk to a urologist about your symptoms. A urologist is a doctor who focuses on problems of the urinary system and male reproductive system. Talk to one about:

- **Hematuria** (blood in the urine) - the most common symptom, often without pain
- Frequent and urgent urination
- Pain when you pass urine
- Pain in your lower abdomen
- Back pain

Symptoms You Should Not Ignore

Blood in the urine is the most common symptom of bladder cancer. It is generally painless. Often, you cannot see blood in your urine without a microscope. If you can see blood with your naked eye you should tell your healthcare provider immediately. Even if the blood goes away, you should still talk to your doctor about it.

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**. But a very small amount of blood might be normal in some people.

Frequent urination and pain when you pass urine (dysuria) are less common symptoms of bladder cancer. If you have these symptoms, it's important to see your healthcare provider. He/she will find out if you have a **urinary tract infection** or something more serious, like bladder cancer.

What Causes Bladder Cancer?

People can get bladder cancer when they come into contact with tobacco or other cancer-causing agents. 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.

Smoking is a Big Risk Factor

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.

Workplace Exposure is another Known Cause

Some things 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 Non-muscle Invasive 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 Non-Muscle Invasive Bladder Cancer

The following tests most likely will be done:

- **Urine 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) with a bladder scope "cystoscopy" are often good enough to diagnose bladder cancer.
- **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. These tests help diagnose and stage bladder cancer.

- **Retrograde pyelogram:** This test uses x-rays to look at your bladder, ureters and kidneys. The test is done during a cystoscopy.
- **Magnetic resonance imaging (MRI)** These tests use a powerful magnetic field, radio waves and a computer to produce detailed pictures of the inside of your body.

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

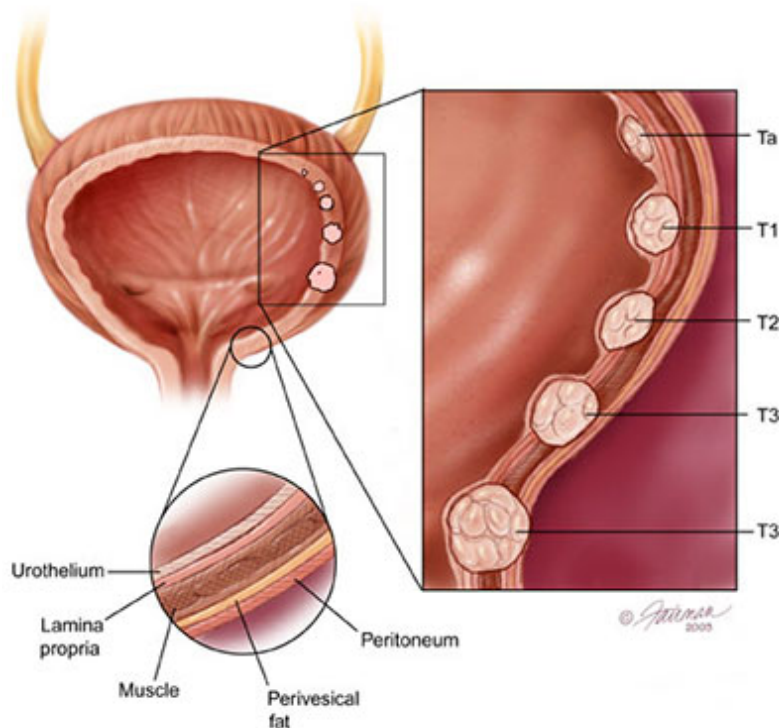
- T4: Tumor has spread to nearby structures of the bladder such as the prostate in men or the vagina in females

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.



Stages of bladder cancer

How is Non-muscle Invasive Bladder Cancer Treated?

A cancer diagnosis can be very frightening. However, your doctor and medical team are there to help you.

Talk with your healthcare team about all the available forms of treatment. They will tell you about possible risks and the side effects of treatment on your quality of life.

Your options for treatment will depend on how much your cancer has grown. Your urologist will stage and grade your cancer and assess the best way to manage your care considering your risk. Risks are classified as low, intermediate or high and suggests the likelihood of tumor recurrence and/or progression. Treatment also depends on your general health and age.

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.

Cystoscopic 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 resectioned more than once. During your follow-up examinations your doctor will check to make sure all the cancer is removed.

Intravesical Therapy

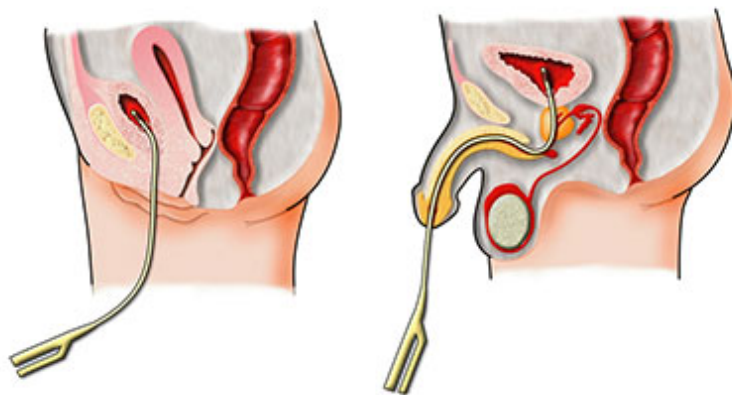
What to expect from Intravesical Therapy

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.



Catheters used in intravesical therapy

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.

Removing the bladder

Surgery to Remove the Bladder

If you have NMIBC, you may have to remove your bladder if intravesical BCG therapy fails. You may also need to remove it if you are at a greater risk of getting the cancer again or of it spreading. Cystectomy 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)

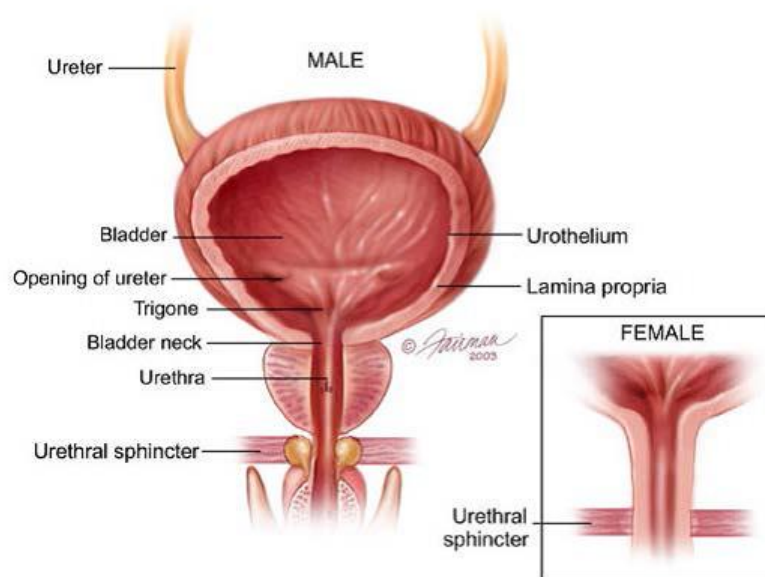
Partial cystectomy is a good choice for some patients if the tumor is located in a specific part of the bladder and does not involve more than one spot in the bladder. The surgeon removes the tumor, the part of the bladder containing the tumor, and nearby lymph nodes. After part of the bladder is removed, 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)

For NMIBC, radical cystectomy is usually done if other therapies fail. 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.



Male and Female Bladder and Urethra

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 "dump" the bag several times a day. This is the most simple, 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. For more information on urinary diversion visit our [Urinary Diversion](#) article.

What about Clinical Trials?

You may hear about possible clinical trials for your bladder cancer. Clinical trials are research studies that involve people. They test if a new treatment or procedure is safe and effective.

Through clinical trials, doctors find new ways to improve treatments and the quality of life for people with disease. Although clinical trials may or not be effective for your particular problem, they present an option to think about. Trials are available for all stages of cancer. Please visit our [clinical trials research webpage](#) to learn more.

What Can I Expect After Treatment for MIBC?

You should expect to return to your doctor for re-evaluation and further tests for some time after treatment and surgery. After you complete your initial evaluation and treatment for NMIBC, your healthcare provider may bring you back in, within three to four months, for a cystoscopy to see how you are doing. This helps him/her evaluate if the entire tumor was removed and assess your risk for the tumor to recur.

If your healthcare provider stages you as low-risk for cancer progression, then you will be asked to return, usually in three months, just for a surveillance scope of your bladder.

If you are an intermediate-risk patient, then your healthcare provider may ask you to return for a cystoscopy with cytology every 3-6 months for two years, then 6-12 months for three to four years, and then every year after. Cytology is the examination of cells from the body under a microscope. If you are intermediate to high risk, your urologist may place you on maintenance therapy as described before.

If you are high-risk for cancer progression, your healthcare provider may bring you back every three to four months for two years, then six months for three to four years, and then every year after.

You may also be given imaging tests as your healthcare provider sees fit. These imaging tests will be done to look for cancer in your kidneys and ureters.

If you had surgery, it takes time to heal. The time needed to recover is different for each person. It is common to feel weak or tired for a while. However, like any other major surgery, bladder surgery may have complications. Older patients and women are more likely to get complications after cystectomy.

There are some things you can do before surgery to help your recovery. If you smoke, try to get help so that you can quit before and after surgery. You also need to make sure you eat right so that your body can heal and can cope with the changes.

Here are some possible problems you may have after treatment:

- **Gastrointestinal (GI) problems:** Your bowel function may return more slowly after your surgery. This often happens after abdominal surgery. Your surgeon and other healthcare providers will take steps to monitor bowel function and avoid GI problems.
- **Urinary diversion:** Urinary diversion following bladder surgery may present challenges for which you should prepare yourself. You may need to learn how to remove urine from your body with a catheter. There also is potential for leakage from the stoma (opening) that is made to take away urine. Infections related to urinary diversion may occur, as may infections related to the kidneys.
It is important for you to learn as much as you can about the urinary diversion method that you will use, and how to manage changes to your body. Before you leave the hospital, your healthcare providers will ensure that you get the education you need so you can manage your new way of life.
- **Hormonal changes:** For females who are not yet menopausal, you may have hot flashes after your ovaries are removed.
- **Reproductive health:** When the prostate is removed, a man can no longer father a child. Also, a man may be unable to have sex after surgery. When the uterus is removed, a woman can no longer get pregnant. If the surgeon removes part of a woman's vagina, then sex may be difficult.
- **Sexual dysfunction:** In reality, bladder cancer surgery is likely to affect your sex life. If you have a partner, you may be worried about maintaining sexual intimacy and your relationship. It may help you and your partner to talk about your feelings. You can find other ways to be intimate after you had treatment.
If you do not have a partner, you may want to explore how to manage your dating life after bladder cancer surgery. Either way, you (and your partner) may benefit from the advice of a counselor who specializes in discussing sexual issues.
Your healthcare provider may be able to refer you to medical professionals and counselors who specialize in sexual issues after cancer treatment. You can also find a certified sex therapist near you on the website of the **American Association of Sexuality Educators, Counselors and Therapists**.
- **Managing Pain:** You may have pain or discomfort for the first few days following bladder surgery. Medicine can help control your pain. Before surgery, you should discuss the plan for pain relief with your doctor or nurse. After surgery, your doctor can adjust the plan if you need more pain control. Refer to the **Pain Management Fact Sheet**

Remember that each person is different and each body may respond differently to therapy. It is important that you take care of yourself and remain in contact with your healthcare provider. Try to adopt healthy lifestyle habits including exercise, a well-balanced diet and no smoking. Your healthcare provider also may recommend a cancer support group or individual counseling.