CONDITION

Bladder cancer

Learn about bladder cancer symptoms, risk factors, diagnosis, treatment options, possible complications, and the need for long-term follow-up.

WHAT IT IS
Cancer beginning in bladder cells

BODY SYSTEM
Urinary system

MAIN SYMPTOMS
Blood in urine, frequent urination, urinary urgency, painful urination

WHAT CAUSES IT
Genetic changes, often of unknown cause

HOW IT IS DIAGNOSED
Cystoscopy and TURBT tissue examination

MAIN TREATMENT
Surgery, bladder-directed therapy, systemic therapy

CAN IT BE CURED?
Sometimes - localized tumors can be removed

IS IT AN EMERGENCY?
Sometimes - heavy bleeding with clots

LONG-TERM OUTLOOK
Varies by stage, with recurrence and spread possible

Overview

Bladder cancer begins when cells in the bladder grow out of control. The bladder is a hollow organ in the lower abdomen that stores urine before it leaves the body.

Most bladder cancers start in urothelial cells, which line the inside of the bladder. This type is called urothelial carcinoma . Less common types include squamous cell carcinoma, adenocarcinoma, and small cell carcinoma.

Doctors often group bladder cancer by how deeply it has grown:

The cancer's grade is also important. Low-grade tumors tend to grow more slowly. High-grade tumors are more likely to return, invade the bladder wall, or spread.

Bladder cancer matters because even early tumors can come back after treatment. Some

return at the same stage, while others become more invasive. Regular bladder examinations are therefore a central part of care.

- Non-muscle-invasive bladder cancer is limited to the inner lining or nearby connective tissue. It has not grown into the bladder's muscle layer.
- Muscle-invasive bladder cancer has reached the bladder muscle. It is more likely to spread outside the bladder.
- Metastatic bladder cancer has spread to distant lymph nodes or organs.

Symptoms

Blood in the urine, called hematuria , is the most common symptom. Urine may look pink, red, rust-colored, or brown. The bleeding can come and go, and it may not cause pain. A urine test may also find blood that is too small to see.

Other possible symptoms include:

These symptoms are not specific to bladder cancer. Urinary infections, kidney stones, an enlarged prostate, medicines, and other conditions can cause similar problems. Even so, visible blood in the urine should be medically evaluated, including when it occurs only once or seems to stop.

More advanced disease may cause persistent pain in the lower abdomen or back, reduced appetite, unexplained weight loss, swelling in a leg, tiredness, or bone pain. These symptoms also have many possible causes and do not establish a diagnosis.

Seek prompt medical care for visible blood in the urine or ongoing urinary changes. Go to an emergency department for heavy bleeding with clots, inability to urinate, severe or rapidly worsening pain, fainting, marked weakness, or breathing difficulty.

- Needing to urinate more often than usual
- A sudden, strong urge to urinate
- Pain or burning during urination
- Difficulty starting or maintaining the urine stream
- Feeling that the bladder does not empty fully

Causes and risk factors

Bladder cancer develops after genetic changes cause bladder cells to grow abnormally. The

exact reason these changes occur is not always known.

Tobacco use is the most important preventable risk factor. Chemicals from tobacco smoke enter the bloodstream, are filtered by the kidneys, and collect in urine. This exposes the bladder lining to substances that can damage cells. Risk can remain elevated after a person stops smoking, but quitting still has important health benefits.

Other factors associated with bladder cancer include:

Having one or more risk factors does not mean that a person will develop bladder cancer. Some people who develop it have no clear risk factor.

There is no standard routine screening test for bladder cancer in people without symptoms who are at average risk. People with major occupational exposures or an inherited syndrome should ask whether specialized monitoring is appropriate.

- Older age: Most cases occur in older adults, although younger people can develop it.
- Sex: Bladder cancer is diagnosed more often in men than in women.
- Workplace chemical exposure: Long-term exposure to certain aromatic amines used in some dye, rubber, leather, paint, printing, and metal industries can increase risk. Modern safety rules have reduced many exposures.
- Previous bladder cancer: People treated for one bladder tumor have a higher chance of developing another.
- Certain cancer treatments: Previous pelvic radiation and the chemotherapy medicine cyclophosphamide can raise risk.
- Long-term bladder irritation: Chronic inflammation, certain urinary tract conditions, and long-term catheter use are associated with some uncommon bladder cancers.
- Schistosomiasis: Long-term infection with this parasite is linked to bladder cancer in regions where the infection is common.
- Arsenic exposure: High arsenic levels in drinking water can increase risk.
- Inherited conditions: A small number of cases are related to inherited cancer syndromes, including Lynch syndrome.

Diagnosis

Evaluation usually begins with a medical history, physical examination, and urine testing. A urinalysis checks for blood and signs of infection. Urine cytology may be used to look for abnormal cells shed into the urine. Cytology can help detect some high-grade cancers, but a

negative result does not rule out bladder cancer.

The main examination is cystoscopy . During cystoscopy, a clinician passes a thin viewing instrument through the urethra, the tube that carries urine out of the body. This allows the bladder lining to be examined directly. Local numbing medicine is often used for an office cystoscopy.

If an abnormal area is found, the next step is usually a transurethral resection of bladder tumor , or TURBT. During this procedure, instruments are passed through the urethra to remove visible tumor tissue. No skin incision is required.

A pathologist examines the tissue to determine:

A second TURBT may be needed if the first sample did not include enough muscle, the tumor was not fully removed, or the findings suggest a higher risk of remaining disease.

Imaging helps examine the urinary tract and look for spread. CT urography uses computed tomography and contrast material to view the kidneys, ureters, and bladder. MRI, ultrasound, chest imaging, or other scans may be used depending on kidney function, symptoms, and the likely stage.

The cancer is then assigned a stage. Stage describes whether it is limited to the bladder lining, has entered muscle or nearby organs, or has spread elsewhere. Stage, grade, tumor number and size, carcinoma in situ, previous recurrences, general health, and personal goals all help guide treatment.

- The type of cancer
- Whether it is low grade or high grade
- How deeply it has grown into the bladder wall
- Whether bladder muscle is present and involved

Treatment and management

Treatment depends on the cancer's stage, grade, and risk of returning or progressing. Kidney function, hearing, nerve health, other medical conditions, and patient preferences may also affect the plan. Care may involve urologists, medical oncologists, radiation oncologists, pathologists, and specialist nurses.

Non-muscle-invasive bladder cancer

TURBT is usually the first treatment. It removes visible disease and provides the tissue needed for diagnosis.

Some people receive medicine placed directly into the bladder through a catheter. This is called intravesical therapy . Because the medicine mainly stays in the bladder, its effects differ from those of treatment given throughout the body.

An intravesical chemotherapy medicine may be given soon after TURBT in selected cases. For tumors with a greater chance of returning or progressing, treatment may include bacillus Calmette-Guérin, or BCG . BCG is a form of immunotherapy that activates an immune response in the bladder.

Possible intravesical treatment effects include urinary urgency, frequent urination, burning, discomfort, and blood in the urine. Fever or feeling significantly unwell after BCG needs prompt medical advice because serious infection, although uncommon, can occur.

Some high-risk cancers do not respond adequately to bladder treatment or return after appropriate BCG. Options may include other bladder-directed or systemic medicines, clinical trials, or surgery to remove the bladder.

Muscle-invasive bladder cancer

A common approach is radical cystectomy , which removes the bladder and nearby lymph nodes. Other nearby organs may also be removed depending on anatomy and the cancer's location.

For eligible patients, cisplatin-based chemotherapy is often given before surgery. This is called neoadjuvant chemotherapy . Treatment after surgery may be considered when the pathology shows a higher risk of recurrence.

After bladder removal, the surgeon creates another way for urine to leave the body. Options include an ileal conduit that drains into an external pouch, an internal reservoir emptied with a catheter, or a neobladder connected to the urethra. Each option has different effects on daily care, continence, and quality of life.

Some people may be able to keep the bladder through trimodality therapy . This combines the most complete TURBT possible with radiation and chemotherapy. It requires careful selection and close long-term cystoscopy because cancer can remain or return in the bladder.

Advanced or metastatic cancer

Treatment that reaches the whole body is called systemic therapy. Depending on previous treatment, tumor features, organ function, and overall health, options may include chemotherapy, immune checkpoint inhibitors, antibody-drug conjugates, or targeted therapy for tumors with certain gene changes.

Tumor testing may help identify whether targeted treatment is an option. Clinical trials may provide access to new combinations or treatment strategies.

Supportive and palliative care can be provided at any stage. It focuses on pain, urinary symptoms, fatigue, appetite, emotional stress, and treatment side effects. It can be given alongside cancer treatment.

Complications

Bladder cancer can return after treatment, particularly when it began as non-muscle-invasive disease. A recurrence may remain superficial or become more invasive. This is why follow-up continues even when no cancer is visible.

A growing tumor may block urine flow from a kidney, causing swelling called hydronephrosis . Bleeding may lead to clots, difficulty urinating, or anemia. Cancer that spreads can affect lymph nodes, bones, lungs, liver, or other organs.

Treatment may also cause complications. Surgery can lead to infection, bleeding, blood clots, bowel problems, urine leakage, kidney problems, or narrowing where the urinary tract was reconstructed. Radiation can irritate the bladder or bowel. Systemic treatments may affect blood counts, nerves, hearing, kidneys, skin, digestion, or immune function.

Bladder removal and pelvic treatment can affect sexual function, fertility, continence, and body image. Rehabilitation, sexual-health care, fertility counseling, ostomy support, and mental-health services may help people adjust.

Follow up

Follow-up is based on the original tumor's stage and risk. After non-muscle-invasive cancer, it usually includes repeated cystoscopy. Urine cytology and imaging of the upper urinary tract may also be needed. Higher-risk disease generally requires closer monitoring than a single low-risk tumor.

After treatment for muscle-invasive cancer, follow-up may include examinations, blood tests, and scans to look for recurrence and assess kidney function. People with a urinary diversion need monitoring for infections, stones, narrowing, skin problems, electrolyte changes, and vitamin deficiencies when relevant.

Contact the care team between scheduled visits for new blood in the urine, worsening urinary symptoms, unexplained pain, new swelling, weight loss, or treatment side effects. Fever after BCG, reduced urine output, or symptoms of infection deserve prompt advice.

Heavy bleeding, inability to pass urine, severe shortness of breath, fainting, confusion, or sudden severe pain requires emergency assessment.

Stopping tobacco use can reduce the risk of other cancers and heart or lung disease. Follow-up visits are also a good time to review physical activity, nutrition, vaccines, emotional health, sexual concerns, and practical care of a urinary diversion.

Sources

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