



## BLADDER CANCER

### Bladder Anatomy

The bladder, a hollow organ in the lower abdomen, is shaped like a small balloon that changes in size based upon its fullness. It is composed of three tissue layers: 1.) an inner lining called the urothelium, 2.) a middle layer filled with small blood vessels and lymphatics called the lamina propria, and 3.) a thick outer muscular layer called the muscularis propria. Urine passes from the kidneys into the bladder through two tubes called ureters, and the bladder stores urine until it is passed out of the body via the urethra.

### Epidemiology

In 2008, 68,810 new cases of bladder cancer were diagnosed with 14,100 deaths recorded. Bladder cancer begins most often in the urothelium, the cells that line the inside of the bladder. The three types of bladder cancer are named for the type of cells that become cancerous:

- Transitional Cell Carcinoma: Cancer that begins in cells in the innermost tissue layer of the bladder. Most bladder cancers begin in the transitional cells.
- Squamous Cell Carcinoma: Cancer that begins in squamous cells, which are thin, flat cells that may form in the bladder after long-term infection or irritation.
- Adenocarcinoma: Cancer that begins in glandular (secretory) cells that may form in the bladder after long-term irritation and inflammation.

### Risk Factors

**Smoking.** Smoking may increase your risk of bladder cancer by causing harmful chemicals to accumulate in your urine. When you smoke, your body processes the chemicals in the smoke and excretes some of them in your urine. These harmful chemicals may damage the lining of your bladder, which can increase your risk of cancer.

**Chemical exposure.** Your kidneys play a key role in filtering harmful chemicals from your bloodstream and moving them into your bladder. Because of this, it's thought that being around certain chemicals may increase your risk of bladder cancer. Chemicals linked to bladder cancer risk include arsenic and chemicals used in the manufacture of dyes, rubber, leather, textiles and paint products. Smokers who are exposed to toxic chemicals may have an even higher risk of bladder cancer.

**Chemotherapy and radiation therapy.** Treatment with the anti-cancer drugs cyclophosphamide (Cytoxan) and ifosfamide (Ifex) increases your risk of bladder cancer. Studies of women treated with radiation therapy for cervical cancer have shown an elevated risk of subsequently developing bladder cancer. But the same doesn't appear to be true for men who receive primary radiation therapy for prostate cancer.

**Chronic bladder inflammation.** Chronic or repeated urinary infections or inflammations (cystitis), such as may happen with long-term use of a urinary catheter, may increase your risk of a squamous cell bladder cancer. In some areas of the world, squamous cell carcinoma is linked to chronic inflammation caused by infection with a parasite.

### Staging

- T<sub>a</sub>: Noninvasive papillary carcinoma
- T<sub>is</sub>: Carcinoma in situ (CIS); noninvasive flat carcinoma
- T<sub>1</sub>: The tumor has grown below the urothelial lining but not as deep as the muscle tissue

- T2: The tumor has grown into the muscle layer
- T2a: The tumor has grown into the inner half of the muscle layer
- T2b: The tumor has grown into the outer half of the muscle layer
- T3: The tumor has grown outside the bladder into the fatty tissue that surrounds the bladder
- T3a: The tumor's spread to fatty tissue surrounding the bladder can only be seen by using a microscope
- T3b: The tumor's spread to fatty tissue surrounding the bladder is large enough to be seen on imaging tests or to be seen or felt by the surgeon
- T4: The tumor has spread to beyond the fatty tissue. It is growing into any of the following: prostate, uterus, vagina, pelvic wall, or abdominal wall
- T4a: The tumor has spread to the prostate, uterus, and/or vagina
- T4b: The tumor has spread to the pelvic wall or the abdominal wall
- N: regional lymph node categories
- NX: Regional lymph nodes cannot be assessed due to lack of information
- N0: No regional lymph node spread
- N1: The cancer has spread to a single lymph node that is 2 cm (4/5 inch) or smaller
- N2: Either:
  - The cancer has spread to a single lymph node that is larger than 2 cm but not larger than 5 cm (2 inches); or
  - The cancer has spread to 2 or more lymph nodes, none of which is larger than 5 cm
- N3: The cancer has spread to a lymph node that is larger than 5 cm
- M: distant spread (metastasis) categories
- MX: Distant spread was not determined
- M0: No signs of distant spread
- M1: The cancer has spread to distant lymph nodes, organs, or tissues (like the bones, lungs, or liver)

## Treatment

Bladder cancer can be treated surgically, medically or with combination therapy. Surgical therapy may include removal of only the tumor using endoscopic techniques, removal of the entire bladder or in specific cases, removal or only the portion of the bladder involved with cancer.

Treatment for bladder cancer is strongly influenced by the stage and grade of the tumor. Treatment may include surgical resection with an endoscope followed by intravesical therapy (BCG or Mitomycin C) for superficial or non-invasive disease. If the tumor invades into the surrounding muscle surgical options include removal of the entire bladder with the addition of chemotherapy before or after surgery, depending once again on the stage and grade of the tumor.

A complete pelvic lymph node dissection is also very important during surgery for invasive or high grade bladder cancer. The pelvic lymph nodes are considered to be the first site of spread or metastasis for bladder cancer and a thorough lymph node dissection, in some cases, may be curative even in the face of metastatic disease. If enlarged lymph nodes are suspected on radiologic imaging (CAT scan) before or after surgery, chemotherapy may be utilized so as to try and eradicate the cancer cells within the lymph nodes.

Once the bladder has been removed, a urinary diversion must be completed as well. This may involve using a segment of small or large intestine to create a new bladder or a conduit in which the urine may collect and drain. The urinary diversion may be considered continent (requiring intermittent drainage) or incontinent (continually draining) into an appliance or bag. The decision as to which urinary diversion is best for each patient is influenced strongly by the patient's previous medical/surgical history, patient preference and lifestyle choices.