

TRANSITIONAL CELL CARCINOMA (Bladder)	
<p>Description</p> <p>Transitional Cell Carcinoma (TCC) <i>NIH</i></p>	<p>Transitional cell carcinoma (<i>NIH</i>)</p> <p>Cancer that begins in cells in the innermost tissue layer of the bladder. These cells are able to stretch when the bladder is full and shrink when it is emptied. Most bladder cancers begin in the transitional cells. Transitional cell carcinoma can be low- grade or high-grade:</p> <ul style="list-style-type: none"> • Low-grade transitional cell carcinoma often recurs (comes back) after treatment, but rarely spreads into the muscle layer of the bladder or to other parts of the body. • High-grade transitional cell carcinoma often recurs (comes back) after treatment and often spreads into the muscle layer of the bladder, to other parts of the body and to lymph nodes. Almost all deaths from bladder cancer are due to high-grade disease. (<i>NIH</i>)
<p>Breeds at Risk</p> <p>Breeds at Risk <i>AKC</i></p>	<p>Breeds at Risk (<i>AKC</i>)</p> <ul style="list-style-type: none"> • Scottish Terrier • West Highland White Terrier • Beagle • Shetland Sheepdog • Wire Fox Terrier • American Eskimo Dog <p>Researchers behind the CADET Braf test has identified a few more dog breeds that could also be at risk:</p> <ul style="list-style-type: none"> • Australian Cattle Dog • Australian Shepherd • Bichon Frise • Border Collie • Parson Russell Terrier • Lhasa Apso • Rat Terrier • Russell Terrier (<i>AKC</i>)
<p>Causes and Environmental Factors</p> <p>Causes of Bladder Cancer in Dogs <i>PetMD by Chewy</i></p>	<p>Causes of Bladder Cancer in Dogs (<i>PetMD by Chewy</i>)</p> <p>Most causes of bladder cancer in dogs can't be identified. However, certain factors increase a dog's risk of bladder cancer, including:</p> <ul style="list-style-type: none"> • Age—Bladder cancer is more common in dogs 10 years of age and older. • Sex—Female dogs have a higher TCC risk than male dogs, possibly because they urine mark less frequently and therefore toxins stay in the urinary bladder longer. • Breed—Scottish Terriers have an 18- to 20-fold higher TCC risk than other dog breeds, while Shetland Sheepdogs, Beagles, West Highland Terriers, and Wire Hair Fox Terriers have a three- to five-times higher risk than other dog breeds. • Body condition—Obese and overweight dogs have an increased risk of developing bladder cancer. • Chemotherapy—Certain chemotherapy treatments can cause bladder cancer in dogs. • Environmental factors— <ul style="list-style-type: none"> ○ Certain pesticides and insecticides—such as those found in flea dips used in the past—have been linked to bladder cancer. Exposure to lawn herbicides and pesticides may also be a contributing factor.

	<ul style="list-style-type: none"> o Additionally, some studies suggest that secondhand smoke can increase a dog's bladder cancer risk. This is attributed to the carcinogens (cancer-causing substances) found in tobacco smoke, which, when inhaled, can be absorbed into the bloodstream. Once excreted in urine, these substances directly affect the bladder, potentially leading to damage and an elevated risk of bladder cancer. <i>(PetMD by Chewy)</i>
<p>BRAF Gene</p> <p>CADET Test</p> <p>Why Veterinarians Use the Cadet BRAF Urine Test <i>Dog Cancer.com</i></p> <p>Should My Dog Get the CADET Braf Test? <i>AKC</i></p>	<p>What Is the CADET Braf Test? A Cadet BRAF test is a urine test that detects whether a genetic mutation for TCC (transitional cell carcinoma, a common bladder cancer) is present.</p> <p>Why Veterinarians Use the Cadet BRAF Urine Test <i>(DogCancer.com)</i> The Cadet BRAF urine test is 95% accurate in detecting transitional cell carcinoma (TCC) that contains cells with the BRAF genetic mutation.</p> <ul style="list-style-type: none"> • Transitional cell carcinoma, or urothelial carcinoma (UC), is the most common type of canine bladder cancer. • Bladder cancer in dogs is rare, comprising only 2% of all canine cancers. • A negative Cadet BRAF urine test can mean either that it is not TCC or that it is a form of TCC that does not carry the mutation being tested for (BRAF), in which case further testing may be recommended. <i>(DogCancer.com)</i> <p>Should My Dog Get the CADET Braf Test? <i>(AKC)</i> Although all breeds of dogs can develop bladder cancer, it is relatively rare. However, if you own a high-risk breed, it might be worth talking to your veterinarian about the CADET Braf test, especially as your dog enters his senior years. Dr. Arteaga recommends all at-risk breeds have the screening test after age 8, and Dr. Sigmon recommends that dogs over 6 years old with a history of multiple episodes of bloody urine get tested for bladder cancer. She also advises breeders of at-risk breeds to invest in an annual subscription of the CADET Braf Mutation Assay to help monitor bladder cancer within their breeding programs. For more questions about your dog's risk of bladder cancer and the CADET Braf test, talk to your veterinarian or visit SentinelBiomedical.com. <i>(AKC)</i></p>
<p>Symptoms</p> <p>Symptoms of Bladder Cancer in Dogs <i>First Vet</i></p>	<p>Symptoms of Bladder Cancer in Dogs <i>(First Vet)</i></p> <ul style="list-style-type: none"> • Straining to urinate • Frequent urination • Painful urination • Blood-tinged urine • Incontinence <p>These symptoms are usually also seen in dogs with urinary tract infections. Antibiotics will initially improve the symptoms, but if cancer or another issue is present, recurrence occurs within a short span of time. <i>(First Vet)</i></p>

Testing / Diagnosis

How Bladder Cancer is Diagnosed in Dogs

First Vet

How Bladder Cancer is Diagnosed in Dogs *(First Vet)*

More than 50% of dogs diagnosed with bladder cancer have TCC that involves the urethra. A tumor in the urethra can block urine flow, causing the affected pet to strain while attempting to urinate. If urine is unable to pass through, it can eventually lead to damage to the kidney and possibly [kidney failure](#).

- The tumor usually develops in the lower neck of the urinary bladder, which makes surgical removal impossible. This causes a partial or complete obstruction to the flow of urine during urination. The tumor may be felt by a veterinarian through the abdomen wall if it's already large.
- A digital rectal exam may also reveal tumors in the abdominal [lymph nodes](#) if metastasis has occurred. If the tumor has spread to the bones, lameness and/or bone pain can be observed.

After a thorough physical exam, your vet may recommend the following tests to confirm the initial findings:

- **Urinalysis**
Sometimes, the urine of dogs with TCC has cancer cells. However, [urinalysis](#) is unreliable when it comes to diagnosing bladder cancer because similar cells may appear during urinary tract infections.
- **Blood work**
Most dogs with TCC have normal [blood work](#) except when kidney function is already affected. But the blood work results can serve as baseline data when evaluating the effect of treatment options.
- **Veterinary Bladder Tumor Antigen (VBTA) Test**
This test checks the urine of dogs for bladder cancer. However, false positives have been recorded in dogs with bladder infections.
- **Imaging**
Bladder tumors are rarely seen on abdominal [x-rays](#) unless they have spread to the bones. Chest x-rays are useful in determining whether bladder cancer has spread to the lungs.
 - A cystogram may be helpful when the veterinarian suspects the spread of the tumor to the dog's urethra. The procedure uses a special dye to make the tumor visible during x-rays.
- **Abdominal ultrasound** can help in assessing the tumor size within the urinary bladder and the size of adjacent lymph nodes.
- **Tissue Biopsy**
This is performed as a definitive test to diagnose TCC or other cancer of the urinary bladder. Cells may be collected via a surgical biopsy or a urinary catheter and examined microscopically.
- Cystoscopy can be used in female dogs.
The procedure involves inserting a camera into the bladder to visualize the tumor. Cystoscopy can also be used for tumor biopsy. *(First Vet)*

<p>Staging</p> <p>Tumor Staging for Bladder Cancer (First Vet)</p>	<p>Tumor Staging for Bladder Cancer (First Vet)</p> <p>Once TCC is confirmed, “tumor staging” will follow to assess the extent of the tumor.</p> <p>Purpose of Tumor Staging</p> <ul style="list-style-type: none"> • Help determine the best treatment regimen that will be followed • Provide important information about the prognosis • Establish baseline data regarding the tumor measurements. This can help determine if certain treatments that will be successful. <p>Tumor staging is achieved with the help of x-rays (radiographs), ultrasound, and CT scans to see if there is metastasis to the lungs, abdomen, lymph nodes, and other organs. These procedures can also evaluate changes in the kidneys as a result of urine flow obstruction. The exact location and the size of the tumor within the bladder can also be determined. (First Vet)</p>
<p>Treatment</p> <p>Treatment Merck Veterinary Manual</p> <p>Treatment Options for Bladder Cancer in Dogs First Vet</p>	<p>Treatment (Merck Veterinary Manual)</p> <ul style="list-style-type: none"> • Excision of the tumor, if possible, is the most beneficial therapy. Transitional cell carcinomas are frequently located at the trigone of the bladder or in the urethra and may necessitate radical reconstructive surgery of the lower urinary tract. • Radiation therapy and/or chemotherapy with piroxicam, cisplatin, doxorubicin, vinblastine, chlorambucil, or mitoxantrone will generally prolong the life of affected animals. • Dogs with transitional cell carcinoma, including those being treated for the tumor, are predisposed to development of bacterial urinary tract infections, and routine urine cultures are indicated. (Merck Veterinary Manual) <p>Treatment Options for Bladder Cancer in Dogs (First Vet)</p> <p>The treatment regimen will depend on the information gathered from the various tests and procedures that have been performed.</p> <p>Surgical Removal</p> <p>Excision of the tumor is only possible when it’s located away from the neck of the bladder and urethra. The presence of important structures prevents surgical excision in this area.</p> <p>Radiation Therapy</p> <p>If surgical removal of the tumor is not possible, radiation therapy has been known to be successful at controlling the growth of the bladder tumor. The procedure, however, has its downsides and challenges. These include the following:</p> <ul style="list-style-type: none"> • Radiation can cause scarring and shrinking of bladder tissues. • Irritation of surrounding organs • The bladder, which is the primary target of radiation, changes shapes depending on the amount of urine in the bladder or when pressure is exerted on the bladder by adjacent organs. <p>Medications</p> <p>Certain medications have been known to cause remission and cancer control in some dogs. These include piroxicam (a type of NSAID) and vinblastine (a chemotherapy drug).</p> <p>Symptomatic Care</p> <p>Since dogs with TCC are very prone to developing cystitis (bacterial infection in the bladder), there may be a need for frequent urinalysis, urine culture, and antibiotic treatment.</p> <p>If the flow of urine into and out of the bladder is obstructed, stents can be placed in the spot where the obstruction is located (ureters or urethra) to open up the passage and restore the urine flow. A cystotomy tube can also be placed to bypass a urethral obstruction and allow for proper emptying of the urinary bladder. (First Vet)</p>

References	<p>AKC - <i>Why Is Bladder Cancer More Likely in These Breeds?</i> American Kennel Club By Anna Burke Updated: Jun 05, 2019 https://www.akc.org/expert-advice/health/bladder-cancer-more-likely-breeds/</p> <p>Dog Cancer.com - <i>Cadet BRAF Urine Test</i> By Leah Talesnick, DVM, CCRP Medically Reviewed by Amanda Hensley, DVM, MPH, CCRT, CVA Updated on January 26, 2024 https://www.dogcancer.com/articles/diagnosis-and-medical-procedures/cadet-braf-urine-test/</p> <p>First vet - <i>Common Types of Bladder Cancer in Dogs</i> https://firstvet.com/us/articles/common-types-of-bladder-cancer-in-dogs</p> <p>Merck Veterinary Manual - <i>Neoplasia of the Urinary System in Small Animals</i> By Scott A. Brown, VMD, PhD, DACVIM Reviewed/Revised Oct 2013 https://www.merckvetmanual.com/urinary-system/noninfectious-diseases-of-the-urinary-system-in-small-animals/neoplasia-of-the-urinary-system-in-small-animals</p> <p>NIH – National Cancer Institute – <i>What is Bladder Cancer?</i> https://www.cancer.gov/types/bladder</p> <p>Pet MD by Chewy - <i>Bladder Cancer in Dogs</i> By Jenny Alonge, DVM Published Dec. 11, 2023 https://www.petmd.com/dog/conditions/cancer/bladder-cancer-dogs</p>
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