

# Canine Urinary Tract Neoplasia

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The principal organs of the urinary tract are the kidneys, ureters, urinary bladder and urethra. The urinary bladder and urethra are the most commonly affected by cancer in the dog and the majority of cancers in these locations are malignant. The most common type of cancer is ***Transitional Cell Carcinoma (TCC)***. This handout reviews the facts about clinical symptoms, diagnosis and treatment of urinary tract cancer in the dog.

## Clinical Features

More common in female dogs, urinary bladder and urethral cancer are typically associated with advanced age (9-10 years). Frequent urination, blood in the urine, and straining to urinate are typical symptoms. These signs are also similar to those of urinary tract infections, thus a cancer diagnosis can be missed early in the course of the disease. If the flow of urine is obstructed, abdominal pain, vomiting, depression and loss of appetite can occur. More rarely, dogs can present with back pain and weakness of the hind limbs due to metastases (spread) of the cancer to the spine and lymph nodes.

## Diagnosis

Abdominal radiographs and abdominal ultrasound can be utilized to detect cancer in the lower urinary tract. Abdominal ultrasound is particularly helpful to assess whether other organs in the abdomen region are affected, such as the kidneys and ureters. *Hydronephrosis* and *hydroureter* are terms describing a back-up of urine flow due to the obstructive effects of a tumor. Regional lymph node enlargement and possible prostate enlargement in male dogs can be assessed quickly and accurately with ultrasound.

Urine analysis is not very helpful as a diagnostic tool in most cases. Occasionally, cancer cells may appear in the urine, but this is not a sensitive test for detection of cancer. The most definitive test to diagnose a cancer is a biopsy and histopathology analysis of the sample. A biopsy can be obtained with cystoscopy, which is a non invasive method to directly visualize the inside lining of the urethra and urinary bladder. Patients most eligible for this test are larger size female dogs. In other patients, an exploratory laparotomy surgery with biopsy of the mass and staging biopsies of the lymph nodes are the alternative method to achieve a diagnosis.

Other diagnostic tests that can be utilized to evaluate a urinary tract mass are CT or MRI imaging. Although these are helpful tests to determine the extent of the cancer and the invasive character of the cancer into surrounding areas, a tissue diagnosis is still necessary to confirm the cancer type.

## **The Exception to the Biopsy Rule**

Although biopsy is recommended to confirm a diagnosis, there are clinical situations which are strongly suggestive for a diagnosis of transitional cell carcinoma. The presence of a soft tissue mass in the trigone region of the urinary bladder with evidence of mineralization on ultrasound evaluation and the unequivocal identification of neoplastic cells in the urine are clear indications of a diagnosis of urinary tract malignancy.

## **Staging**

In one report of 115 dogs with urinary bladder or urethral tumors, 17% had evidence of pulmonary metastases (spread) at the time of diagnosis. Similarly, 39% of dogs had been reported to have lymph node metastases. To determine this in our patients, thoracic radiographs and abdominal ultrasound are strongly recommended prior to initiation of therapy.

## **Treatment**

Surgery can be used to remove urinary bladder cancer lesions early in the course of the disease. Generally cancers that are 2 cm in diameter or smaller can be removed successfully. If a large lesion is identified, and/or the trigone area of the urinary bladder or urethra are affected, prognosis for removal and control of the local disease is poor.

Radiation therapy has been used to attempt local control of urinary bladder and urethral cancer with mixed results. Although this therapy can delay progression of the tumor and its associated clinical symptoms, the side effects can be substantial.

Systemic chemotherapy for urinary cancer is a feasible option to delay progression. The most effective protocols to date incorporate an injectable chemotherapy Mitoxantrone and/or piroxicam (Feldene). The goal with such combination therapy is to improve quality of life and delay progression of the tumor for at least several months. Piroxicam in particular has demonstrated an improvement in clinical signs for many TCC patients. This is thought to be due to the antiangiogenesis as well as the anti-inflammatory properties of the drug. Side effects of piroxicam include gastrointestinal and kidney effects.

## **Palliative Therapy**

In order to provide relief of discomfort (ie "palliative therapy") for a period of time, there are several options available. As mentioned previously, piroxicam is an anti-inflammatory oral agent that can be used to relieve urinary discomfort. Surgical debulking of the tumor can alleviate obstruction of urine flow temporarily. The placement of a cystostomy tube can also address urinary tract obstruction. This is a surgical procedure in which a rubber tube is inserted into the urinary bladder through the abdominal wall and used to empty urine periodically from the patient and avoid urine flow back up. Radiation therapy has been suggested to achieve palliation in urinary cancer patients, however the clinical outcomes with this procedure are inconsistent.