The urinary tract includes the kidneys, the ureters (conduits between the kidneys and the bladder), the bladder, the urethra, and portions of the penis or vagina. Common surgical diseases of the urinary tract in dogs and cats are urinary calculi ("stones"), feline urethral obstruction, and cancer. Left untreated, these conditions can cause pain, bloody urine, urinary tract infections, "accidents" in the house, and they may become life-threatening.

Urinary Calculi ("Stones")

All breeds of dogs and cats can develop urinary calculi. Calculi cause inflammation of the bladder and can become lodged in the urethra or ureters, blocking the flow of urine. Signs of urinary calculi can include:

- Increased frequency of urination
- Straining or inability to urinate
- Blood in the urine
- Crying/vocalizing while urinating

There are different types of urinary calculi. A urinalysis (urine evaluation) should be performed to identify inflammation, infection, and crystals as well as to evaluate kidney function. Depending on the type, calculi may or



Canine Cystic Calculi: Illustration of the canine urinary tract with calculi in the bladder (cystic calculi).

may not be diagnosed by a urinalysis or seen on X-rays. In some situations, an abdominal ultrasound may be required for diagnosis. Once a pet is diagnosed with urinary calculi, the best method to determine the type of calculi, to alleviate the clinical signs the pet is experiencing, and to help prevent formation of additional calculi is to remove the stones surgically.

Cystic and Urethral Calculi

Calculi in the bladder and urethra are more common in dogs than in cats; however both species may be affected.

Struvite calculi primarily occur in young, female dogs.

- Breeds at risk include: beagles, miniature schnauzers, and English cocker spaniels.
- Formation of these stones is associated with urinary tract infection.

Calcium Oxalate calculi primarily occur in middleaged, male dogs.

- Breeds at risk include: miniature schnauzers, Lhasa apsos, Yorkshire terriers, miniature poodles, shihtzus, and bichon frises.
- Stone formation is genetic. Though calculi may recur after surgery, removal is necessary to prevent life-threatening urethral obstruction.

Cats primarily form Calcium Oxalate calculi.

- Stone formation in most cats is thought to be related to diet, however Burmese, Persian, and Himalayan cats are genetically predisposed.
- These cats tend not to have urine crystals or urinary tract infections.

To remove cystic calculi, the bladder is opened (cystotomy) under general anesthesia. In most cases, stones in the urethra can be flushed back into the bladder for removal. Rarely, a stone is completely lodged in the urethra. A PU is performed for cats with this condition. For dogs, an incision (urethrotomy) must be made to remove the stone from the urethra. This incision may be left open permanently (urethrostomy) in dogs with a high risk for recurrence of obstructive urethral calculi or stricture formation.



Cystic Calculi:

An x-ray of a dog with multiple, irregularly-shaped calculi in the bladder.

Feline Urethral Obstruction

Blockage, or obstruction, of the urethra is a significant problem in young to middle-aged male cats. Mucus, crystals, and sometimes tiny calculi (millimeters in size) can collect at the narrowest part of the urethra (in the penis) and form a plug. This plug partially or completely blocks urine flow. Because of the obstruction, the body is unable to regulate certain enzymes and electrolytes that are normally eliminated though urination. Instead, these products build up within the blood stream and may reach toxic levels. Toxicity can cause vomiting, anorexia, lethargy, severe dehydration, and fatal heart arrhythmias. Immediate relief of urethral obstruction is critical to prevent life-threatening toxicity.

Symptoms of Urethral Obstruction

- Increased frequency of (or attempted) urination
- Urination outside of the litter box (especially on cold or flat surfaces)
- Straining to urinate
- Blood in the urine
- Crying/vocalizing while urinating
- Decreased appetite
- Vomiting
- Lethargy

Emergency placement of a temporary urinary catheter can dislodge the plug and remove the obstruction. Cats that are successfully catheterized may need to remain hospitalized for 2 to 3 days to alleviate the buildup of urinary toxins and to help re-establish normal urine flow. Cats that cannot be unblocked by urinary catheterization or that have had repeated episodes of obstruction require surgery to remove the obstruction and prevent future blockage.



Feline Urethral Obstruction: Illustration of a series of calculi or plugs that have lodged in the urethra, creating complete urinary obstruction.

Perineal Urethrostomy

A perineal urethrostomy ("PU") involves removing the narrow penile part of the feline urethra and creating a wider opening for urine flow. In an emergency situation, this surgery is performed to remove a life-threatening urethral obstruction. A PU is also beneficial for cats with a history of obstruction or feline lower urinary tract disease (a common underlying cause of obstruction) because the wider urethral opening helps to prevent future obstructions and associated emergencies. Long-term complications from this procedure, though rare, can include urinary tract infection, stricture formation, and continued stone formation. Cats with feline urinary tract disease may still have bloody urine or strain to urinate, but are less likely to become obstructed after a PU. Employing therapies to manage underlying lower urinary tract disease will further decrease risk of recurrence for these cats. For continued monitoring, cats with a PU should have their urine tested every 3 to 4 months after surgery.

Kidney and Ureteral Calculi

Calculi in the kidneys and ureters are uncommon, and are more often seen in cats than in dogs. Stones that obstruct the flow of urine from the kidneys into the bladder can lead to kidney failure and infection. If this occurs, removal of the calculi and/or affected kidney is recommended. Microsurgical options should be considered even when calculi are not obstructive but kidney function is impaired. Removing kidney or ureteral calculi may prevent further deterioration of kidney function and, if both kidneys are affected, can prevent life-threatening emergencies.



Kidney, Ureteral and Cystic Calculi: An x-ray of a cat showing a single calculus in the kidney, a calculus in the ureter, and several cystic calculi.

Stone Analysis

Once removed, stones are sent to the stone lab for analysis, and these results can take several weeks. Based on the results of the stone analysis, specific recommendations such as diet and lifestyle changes can be made to help prevent future stone formation.

Urinary Tract Cancer

In cats and dogs, urinary tract cancer (neoplasia) most often affects the bladder and the kidneys. When a mass is identified in the urinary tract and suspected to be cancer, complete staging diagnostics — including chest x-rays, an abdominal ultrasound, a complete blood count, and serum blood chemistry — are performed to evaluate the pet's overall health and to determine if the cancer has spread (metastasized). In some patients, it may be advisable to have a biopsy of the mass performed before preparing for surgery. Depending on the extent of cancer spread and the part of the urinary tract affected, surgery may be recommended to remove the mass, diagnose the type of cancer, and improve quality of life.

Conclusions

Urethral obstruction, urinary calculi, and cancer are common disease conditions of the urinary tract in both dogs and cats. Goals of surgical treatment are to relieve pain, resolve clinical signs caused by the disease condition, obtain a definitive diagnosis, and help to prevent future episodes. With surgery for these conditions, your pet's quality of life can be significantly improved.

Evaluation

Evaluation of your dog or cat for early diagnosis and treatment can be critical for these disease conditions. To schedule an evaluation or for further information about the diagnosis and treatment of lower urinary tract diseases, please call Veterinary Surgical Centers of the Delta.





www.vscdsurgerycenters.com

With offices in: Berkeley Dublin Walnut Creek

To schedule an appointment, please call: 925/201-3400 or 510/595-4600





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