



DANADA VETERINARY HOSPITAL, P.C.

Bladder Stones In Dogs and Cats

Bladder stones, or uroliths, are rock-like collections of minerals that form in the urinary bladder. Uroliths may occur as a large, single stone or as dozens of smaller stones. Individual stones can vary in size from tiny stones which can be voided in the urine stream to larger stones the size of a golf ball.

Kidney stones (nephroliths) do not have to be present for bladder stones to form. In fact, kidney stones are relatively uncommon in dogs and cats. Both stones are unrelated to the development of gall stones (stones in the gall bladder).

Bladder stones are classified by their mineral content; this is determined by laboratory analysis of a stone. The types of stones reported to occur in dogs and cats include struvite, calcium oxalate, urate, cystine and silicate stones.

Contributing Factors

Predisposing factors for development of stones are unique for each type of stone but can include the following:

1. Presence of a urinary tract infection
2. Excessive loss of urate or calcium into the urine
3. Inability of the kidney to re-absorb certain amino acids

The factor that can be eliminated with appropriate treatment is a urinary tract infection. For the others, a metabolic disturbance is responsible for stone formation and may not be preventable.

Prevalence

Bladder stones are a relatively common problem in both dogs and cats. Bladder stones are more common in middle-aged animals. Struvite, the most common stone in dogs, is seen with higher frequency in female dogs; the other types of stones are more common to male dogs.

Dog breeds commonly affected with bladder stones include the following: Dalmatian, Pekingese, miniature Schnauzer, Yorkshire Terrier, Scottish Terrier, Dachshund, Bulldog, miniature Poodle, Pug, Basset Hound, Shih Tzu, and Cocker Spaniel. Certain types of stones are more commonly found in certain breeds. For instance, Dalmatians are overly represented as a breed that develops urate stones.

In cats, breeds such as Burmese, Siamese, Himalayans, and Persians are overly prone to stone formation with calcium oxalate the predominant stone type.

Causes/Transmission

The true causes of stone formation are not known. There are several theories in existence, and each is feasible in some circumstances, but there is probably an interaction of more than one of them in each dog. The most accepted theory is called the Precipitation-Crystallization Theory. This theory states that one or more stone-forming salts are present in elevated levels in the urine. This may be due to abnormalities in diet or due to some earlier disease in the bladder, especially infection with bacteria. When the amount of this compound reaches a level so great that it cannot all be dissolved in the urine, it precipitates and forms tiny crystals. These crystals stick together, usually due to mucus-like material within the bladder, and stones gradually form. As time passes, the stones enlarge and may increase in number.

Growth will depend on the quantity of crystalline material present and the degree of infection present. Although it may take months for a large stone to grow, some sizable stones have been documented to form in only a few weeks.

Clinical Signs

The two most common signs of bladder stones are blood in the urine (hematuria) and straining to urinate (dysuria). Hematuria occurs because the stones mechanically irritate the bladder lining, causing bleeding from its surface. Dysuria occurs when stones obstruct the passage of urine out of the bladder. Large stones may cause a partial obstruction at the point where the urine leaves the bladder and enters the urethra; small stones may flow with urine into the urethra.

Bladder stones may also pass into the urethra but be too large to get completely out of the body, resulting in complete obstruction of the urethra. When this occurs, urine cannot pass out of the body and the dog becomes very painful in the abdomen. It may cry in pain, especially if pressure is applied to the abdominal wall.

Hematuria, dysuria, and inability to urinate are the most common signs seen, but abdominal pain usually occurs also. We know this because when bladder stones are removed surgically, many owners tell us that the dog feels noticeably better and is more active soon after surgery.

Diagnosis

Some bladder stones can be palpated (felt with the fingers) through the abdominal wall or with a rectal exam. However, failure to palpate them does not rule them out.

Most bladder stones are visible on radiographs (x-rays) or an ultrasound examination. These procedures are performed if stones are suspected. This includes dogs that show unusual pain when the bladder is palpated, dogs that have recurrent hematuria and dysuria, or dogs that have recurrent bacterial infections in the bladder.

Some bladder stones are not visible on radiographs. They are said to be radiolucent. This means that their mineral composition is such that they do not block the x-ray beam. These stones may be found with

an ultrasound examination or with special radiographs that are made after placing a dye or air (contrast material) into the bladder.

Treatment

There are three options for treatment. Quick results can be achieved with surgical removal of the stones. This requires major surgery in which the abdomen and bladder are opened. Following two to four days of recovery, the dog is relieved of pain and dysuria. The hematuria will often persist for a few more days, and then it stops. Surgery is not the best option for all patients; however, those with urethral obstruction and those with bacterial infections associated with the stones should be operated on unless there are other health conditions that prohibit surgery.

The second option is to dissolve the stone with a special diet. This avoids surgery and can be a particularly good choice for some dogs. However, it has three disadvantages.

1. It is not successful for all types of stones. Unless some sand-sized stones can be collected from the urine and analyzed, it is not possible to know if the stone is of the composition that is likely to be dissolved.
2. It is slow. It may take several weeks or a few months to dissolve a large stone so the dog may continue to have hematuria and dysuria during that time. Continued trauma to the bladder wall may thicken it and leave it scarred.
3. Not all dogs will eat the special diet. If it is not consumed *exclusively*, it will not work.

Finally, in some cases, stones can be accessed via fiberoptic camera (Cystoscopy) and broken down with a laser (lithotripsy) until they are small enough to be retrieved or they are small enough to pass easily in the urine. This procedure requires specialized equipment and referral to a specialist.

Prognosis

Prognosis depends upon whether the underlying cause can be eliminated (urinary tract infection) as well as what type of stone is present. Some stone formation is rooted in a metabolic disturbance such as abnormal calcium or urate clearance. Metabolic tendencies often cannot be manipulated with great success. Therefore, the prognosis for patients with these types of stone is more guarded.

Prognosis is also affected by the level of prevention employed following successful treatment for stones.

Prevention

In many cases, stones can be prevented from recurring a second time. There are at least four types of bladder stones, based on their chemical composition. If stones are removed surgically or if some small ones pass in the urine, they should be analyzed for their composition. This will permit us to determine if a special diet will be helpful in preventing recurrence, or if your pet might have additional health concerns that contributed to the stones forming.

Many specialized diets are now manufactured to help prevent reformation of stones after initial therapy. Your veterinarian will usually recommend one of these diets at the time of diagnosis, and they are typically used for the life of the pet. Genetics, scar tissue from previous surgery, infection, and other factors make recurrence of stones more likely if these diets are not utilized.

Periodic urinalyses and urine cultures may also be recommended to check urine pH, and screen for inflammation and/or infection that might predispose to stones.