

BLADDER STONES

What are bladder stones?

Bladder stones (*uroliths* or *cystic calculi*) are rock-like collections of minerals that form in the urinary bladder. They may occur as a large, single stone or as collections of stones the size of large grains of sand or gravel.

Are these the same as gall stones or kidney stones?

No. Gallstones are in the gall bladder located near the liver, and kidney stones are in the kidney. Although the kidneys and urinary bladder are both part of the urinary system, kidney stones are usually unrelated to bladder stones.

What problems do bladder stones cause?

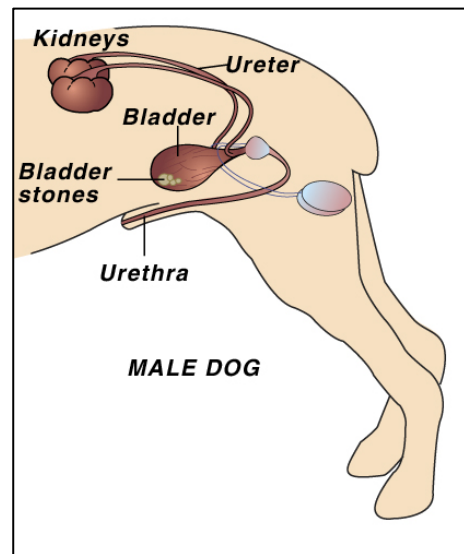
The two most common signs of bladder stones are hematuria (blood in the urine) and dysuria (straining to urinate). Hematuria occurs because the stones irritate the bladder wall causing bleeding. Dysuria occurs when stones obstruct the flow of urine out of the bladder. Large stones may cause a partial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

When an obstruction occurs, the bladder cannot be emptied and this is very painful. Your dog may cry in pain, especially if pressure is applied to the abdominal wall.

Hematuria and dysuria are the most common signs seen in dogs with bladder stones but with obstruction there is also pain. We know this because when bladder stones are removed surgically, many owners tell us how much better and more active their dog feels.

Why do they form?

There are several theories of bladder stone formation. The most commonly accepted theory is called the Precipitation-Crystallization Theory. This theory states that one or more stone-forming crystalline compounds are present in elevated levels in the urine. This may be due to abnormalities in diet or due to some previous disease in the bladder, especially infection with bacteria. Sometimes the condition may be due to a problem with the body's metabolism. When the amount of this compound reaches a threshold level, the urine is said to be *supersaturated*. This means that the level of the compound is so great that it



cannot all be dissolved in the urine, so 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 increase in number.

How fast do they grow?

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 sizeable stones have been documented to form in as little as two weeks.

How are they diagnosed?

Most dogs that have bladder infections do not have bladder stones. These dogs will often have blood in the urine and will strain to urinate, the same symptoms as a dog with bladder stones. Therefore, we do not suspect bladder stones based only on these clinical signs.

Some bladder stones can be palpated (felt with the fingers) through the abdominal wall. 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 reflect the x-ray beam. These stones may be found with an ultrasound examination or with special radiographs that are made after placing a special dye (contrast material) in the bladder.



How are bladder stones treated?

There are two options for treatment. The fastest way is to remove them surgically. 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 days after surgery before resolving. Pets with urethral obstruction should have surgery as soon as possible unless there are other health conditions that prohibit surgery.

The second option is to attempt to dissolve certain types of bladder stones with a special diet. This avoids surgery and can be a very

good choice for some dogs. However, it has three disadvantages:

1. It is not successful for all types of stones. Stone analysis is necessary to determine if it is the type of stone that can be successfully 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. The risk of urethral obstruction remains during this period.
3. Not all dogs will eat the special diet. If it is not consumed *exclusively*, it will not work.

Can bladder stones be prevented?

The answer is a qualified "yes." There are at least four types of bladder stones common in pets. If stones are removed surgically or if some small ones pass in the urine, they should be analyzed for their chemical composition. This will permit us to determine if a special diet will be helpful in preventing recurrence. If a bacterial infection causes stone formation, it is recommended that periodic urinalyses and urine cultures be performed to determine when antibiotics should be given. Periodic bladder x-rays or ultrasounds are helpful in determining if bladder stones are recurring. Early recognition may allow us to offer treatment options before your pet requires surgery.