

BLADDER STONES IN DOGS

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 form in the gall bladder located near the liver, and kidney stones form 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?

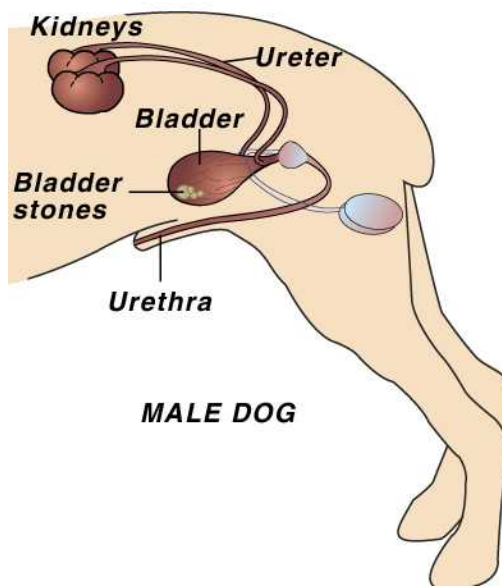
The two most common symptoms of bladder stones are *hematuria* (blood in the urine) and *dysuria* (straining to urinate). Hematuria occurs because the stones irritate and damage the bladder wall causing bleeding. Dysuria occurs when stones obstruct the flow of urine out of the bladder or inflame the bladder walls, causing pain and swelling. Large stones may cause a partial obstruction at the point where the urine leaves the bladder and enters the urethra while smaller stones may flow with the urine into the urethra and cause an obstruction there.

When an obstruction occurs, the bladder cannot be emptied resulting in extreme pain, especially if pressure is applied to the abdominal wall. If the obstruction is complete, the bladder may rupture, which is a life-threatening emergency situation.

When there is no obstruction, hematuria and dysuria are the most common signs seen in dogs with bladder stones. It can be assumed that the condition is painful, based on the fact that many clients remark about how much better and more active their dog has become following surgical removal of bladder stones.

Why do they form?

There are several theories of how bladder stones form. The most commonly accepted theory is called the Precipitation-Crystallization Theory. This theory states that one or more stone-forming crystalline compounds has become present in elevated levels in the urine. This may be due to dietary factors 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?

Bladder stones can develop in a period of weeks to months. Speed of growth will usually 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 bladder stones diagnosed?

The symptoms of bladder stones are similar to those of an uncomplicated bladder infection or cystitis. Most dogs that have bladder infections do not have bladder stones. Therefore, we do not conclude that a dog has bladder stones based only on these common 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. Some stones are too small to be felt in this manner, or the bladder may be too firm to allow palpation.

Most bladder stones are visible on radiographs (x-rays) or a bladder ultrasound examination. If your veterinarian suspects bladder stones, one or both of these procedures will be recommended. They should be performed on 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 a radiographic contrast study, made after placing a special dye or contrast material in the bladder.

How are bladder stones treated?

There are two options for treatment. The fastest treatment solution is to remove them surgically by opening the bladder through an abdominal incision. Following two to four days of recovery, most patients rapidly improve. The hematuria will often persist for a few days after surgery before resolving. Surgery may not be the best option for patients that have other health concerns. However, dogs with urethral obstruction require surgery as soon as possible to minimize other complications.

The second option is to attempt to dissolve certain types of bladder stones with a special dissolution 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. This may not be possible in all cases.
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, dysuria, and recurrent infections during that time. The risk of urethral obstruction remains high during this period.
3. Not all dogs will eat the special diet. If it is not fed *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 dogs. If bladder stones are removed surgically or if some small ones pass in the urine, they should be

analyzed for their chemical composition. This will permit your veterinarian to determine if a special diet will be helpful in preventing recurrence. If the stones formed because of a bacterial infection, it is recommended that periodic urinalyses and urine cultures be performed to identify recurrences and determine if antibiotics should be prescribed. Periodic bladder x-rays or ultrasounds may be helpful in some cases to determine if bladder stones are recurring.

Early recognition may allow your veterinarian to resolve the problem before your pet requires surgery.

*This client information sheet is based on material written by Ernest Ward, DVM.
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