



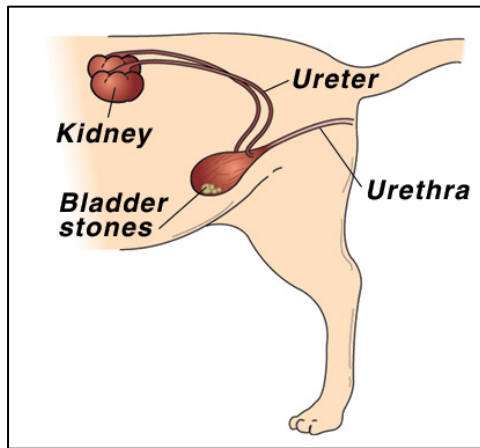
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BLADDER STONES IN CATS

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

Are there other types of stones?



Gall stones are in the gall bladder, and kidney stones are in the kidney. They are not the same as bladder stones. Although the kidneys and urinary bladder are both part of the urinary system, kidney stones are usually unrelated to bladder stones.

What are the clinical signs?

The two most common signs of bladder stones are hematuria (blood in the urine) and dysuria (straining to urinate). Hematuria occurs because the stones mechanically irritate the bladder wall, causing bleeding from its surface into the urine. 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 the urine into the urethra and cause an obstruction there.

When an obstruction occurs, urine cannot pass out of the body and the abdomen becomes very painful. Your cat may cry in pain, especially if pressure is applied to the abdominal wall.

When there is no obstruction, hematuria and dysuria are the most common signs seen in cats with bladder stones. However, bladder stones are known to cause pain. This is because after bladder stones are removed surgically, many owners tell us how much better their cat feels and how much more active it has become.

How do bladder stones form?

There are several theories of bladder stone formation. Each is feasible in some circumstances, but there is probably an interaction of more than one of them in each cat. 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. 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 quickly can they form?

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 as little as two weeks.

How is a diagnosis made?

Most cats that have bladder infections do not have bladder stones. These cats will often have blood in the urine and will strain to urinate. 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 because many are too small to be detected in this manner.

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

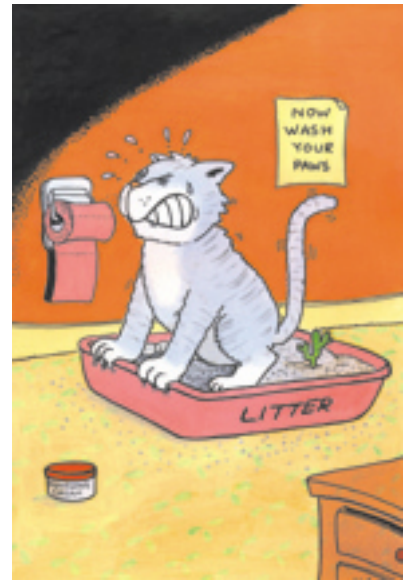
Some bladder stones are not visible on radiographs. They are said to be radiolucent. This means that their mineral composition is such that they do not reflect the x-ray beam. These stones may be found with an ultrasound examination or with special radiographs that are made after placing a special dye (contrast material) in the bladder.

How are they treated?

There are two options for treatment. The fastest solution is to remove them surgically. This requires major surgery in which the abdomen and bladder are opened. Following two to four days of recovery, pain and dysuria are resolved. The hematuria may persist for a few more days and then stop. 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 very good choice for some cats. 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 cat may continue to have hematuria and dysuria during that time.
3. Not all cats will eat the special diet. The diet is not as tasty as the foods that many cats are fed. If it is not consumed *exclusively*, it will not work.



Can bladder stones be prevented?

Prevention is possible in many cases. There are at least four types of bladder stones, based on their chemical composition. If stones are removed surgically or if 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.