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Bladder Stones in Cats
(Urolithiasis)

Bladder stones, more correctly called 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.

Although the kidneys and urinary bladder are both part of the urinary system, kidney stones are usually unrelated to bladder stones. When stones are found in the urinary tract, more than 90% of the time, they are in the bladder.

Contributing Factors

There are several different types of uroliths in cats. It is important to determine the mineral composition of the stones, when possible. Depending upon the type of stone, various risk factors may contribute to urolith formation. Diet, water intake, urinary tract infections, and urinary pH are all-important considerations.

Prevalence

For the most part, urolithiasis affects male and female cats with equal frequency. One particular type of stone (calcium oxalate) reportedly affects male cats more commonly than female cats; also, Burmese, Himalayan, and Persian cats may have a higher incidence of this stone. Some types of stones are more common in younger cats (struvite, or magnesium ammonium phosphate), whereas others tend to occur in more mature cats (calcium oxalate).

Bladder stones are responsible for about 25% of all cases of hematuria (blood in the urine) and dysuria (straining to urinate) in cats.

Clinical Signs

The two most common signs of bladder stones are hematuria and dysuria. Hematuria (blood in the urine) occurs because the stones mechanically irritate the bladder wall, causing bleeding from its fragile surface. Dysuria (difficulty urinating) 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 at its narrow point.

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. The cat may make frequent trips to the litterbox in a futile attempt to urinate.

Even if there is no obstruction occurring, hematuria and dysuria may be significant; the irritated bladder is quite painful. When bladder stones are removed surgically, many owners tell us how much better the cat feels.

Causes/Transmission

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, such as 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 exceeds its ability to dissolve 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.

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.

Diagnosis

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 just based 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.

Treatment

There are two options for treatment. The fastest solution is to remove them surgically. This requires surgery in which the abdomen and bladder are opened. Following two to four days of recovery, the cat 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 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 to the exclusion of all other foods, it will not work.

Prognosis

The prognosis is dependent upon the type of stone, presence of infection, location of the stones, presence of concurrent stones in the kidneys, and any other factors that complicate the health of the cat. In most cases, with appropriate therapy, a favorable outcome is expected.

Prevention

Prevention is possible in many cases. As described above, 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 chemical composition. This will allow determination of the appropriate diet; hopefully, this will minimize the chance of recurrence. If a bacterial infection causes stone formation, periodic urinalyses and urine cultures should be performed to monitor response to treatment.