

BLADDER STONES (CYSTIC CALCULI) in Dogs & Cats

Types & Formation of Bladder Stones

The formation of bladder stones, also referred to as cystic calculi, and urine crystals is a common condition seen in both dogs and cats. The three most common types of stones are struvite (triple phosphate), calcium oxylate, and uric acid stones, although there are many other types that can form. In dogs, certain breeds are prone to developing a particular type of stone. Dalmatians are predisposed to forming uric acid stones due to a genetic defect in uric acid metabolism leading to a much higher concentration of uric acid in the urine. Dogs with liver shunts are also at a higher risk for uric acid stone formation. Struvite and calcium oxylate stones seem to be more prevalent in small breed dogs, especially Miniature Schnauzers, Lhasa Apso's, and Shih Tzu's. In cats, the stones are commonly struvite (triple phosphate) or calcium oxylate.

Stones & crystals form in the kidneys or bladder when high concentrations of minerals precipitate out of urine. Struvite stones & crystals form when the urine is very alkaline (pH greater than 7) whereas calcium oxylate and uric acid stones and crystals form in acidic urine (pH less than 7). Bladder stones & crystals in the urine are important to treat for they can lead to urinary obstruction- a life threatening condition.

Symptoms- Pets with bladder stones often have no clinical signs other than frequent urinary tract infections.

Symptoms of a urinary tract infection include:

- Straining to urinate
- Blood in urine
- Urinating only small amounts of urine at a time and frequently
- Urinating in inappropriate places

Diagnosis of Bladder Stones

- **Bladder stones**- rarely can be palpated. A radiograph (x-ray) is required to look for stones in the urinary tract (kidneys, bladder, & urethra).
- Calcium oxylate and struvite crystals are radio-opaque and show up easily on normal radiographs
- Uric acid stones are radiolucent and will not show up readily on regular films. A special contrast x-ray study must be performed to show uric acid and other radiolucent stones.
- Ultrasound of the urinary tract is useful to look for stones in the kidneys, bladder, urethral neck
- Urinalysis- look for infection & crystals- if present, check for urinary tract stones
- If a stone is retrieved surgically, it should be identified via stone analysis.

Treatment of Bladder Stones (cystic calculi)- Medical Vs Surgical management

- **Medical management-** Many pets with crystals in their urine can be treated medically by placing them on a special diet designed to dissolve existing crystals and prevent future crystal & stone formation by limiting mineral intake and manipulating urine pH.
- Some bladder stones will dissolve with special diets, but the majority require removal via surgery
- Patients with concurrent urinary tract infections should also be treated with antibiotics.
- **Surgical management- via cystotomy surgery-** Most patients with large identifiable bladder stones on radiographs eventually require surgical removal. Large bladder stones often do not dissolve completely and it is recommended that they be surgically removed. If the stones are not removed, at some point they are likely to pass into the urethra during urination and become lodged causing a urethral obstruction.

Prognosis

- Good to fair depending on concurrent problems such as UTI.
- Urine pH needs to be strictly monitored and a special diet should be fed for life in pets prone to forming stones, crystals, and urinary blockages
- Some individuals continue to form despite the most appropriate medical management