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Dog Tips

This Painful, Potentially Dangerous Human Condition Can Affect Your Pet, Too

Humans aren't the only mammals who can suffer from this extremely painful condition. Affecting mostly small breeds, you must be watchful if your pet develops any problem with urination. If any of these five red flags appear, please seek professional help right away.

Reviewed by Dr. Becker

STORY AT-A-GLANCE

- Two types of uroliths — struvite and calcium oxalate stones — account for over three-quarters of the stones diagnosed in North American dogs
- Struvite stones cause include extremely alkaline urine, steroid therapy, abnormal retention of urine and urinary tract infections (UTIs)
- Calcium oxalate uroliths are on the increase in dogs, and there's a strong genetic predisposition to formation of this type of stone
- Treatment depends on the type and location of the stone; prevention always involves bringing the dog's urine pH into a healthy range
- Stones can cause complete blockage of the urethra. If your dog isn't able to urinate, it's a medical emergency requiring immediate veterinary treatment

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Unfortunately, just like humans, our canine companions are prone to developing kidney and bladder stones that can be extremely painful and potentially dangerous.

The type of stone and its location varies, which is why the disorder is called by a mind-boggling array of names, including urinary tract stone disease, bladder stones, urolithiasis, urinary stones, ureteral stones, urinary calculi, ureteral calculi and urinary calculus disease.

The stones themselves also have a variety of names depending on their mineral composition, including struvite or magnesium ammonium phosphate stones, calcium oxalate stones, ammonium urate or uric acid stones, cystine stones, calcium phosphate stones, silica stones and compound stones that are made up of more than one mineral.

Veterinarians typically use the words stone, urolith and calculus/calculi interchangeably to describe the condition.

Breeds at Highest Risk for Bladder and Kidney Stones

Specific breeds at highest risk for kidney and bladder stones include Miniature Schnauzers, Shih Tzus, the Bichon Frise, Cocker Spaniels and Lhasa Apsos. The condition affects dogs of both sexes and all ages, but is most commonly seen in small breed females, 4 to 8 years of age, who are also prone to bladder infections.[1]

Males acquire stones less frequently than females, but they can be much more serious because they can lodge in the male dog's longer, narrower urethra, the tube through which urine moves from the bladder to the outside of the body.

A urethral blockage can make urination impossible, which is a life-threatening emergency.

In 2015, the two most prevalent types of canine uroliths were struvite stones and calcium oxalate stones. In North America, these two types of uroliths accounted for over 75% of stones in dogs.[2]

Two common denominators in many cases of urinary crystals and stones of all types are super concentrated urine and an underlying urinary tract infection (UTI). So two things that should happen right away include:

- Adding moisture to your dog's diet.
- Confirming your pet does not have a UTI. This is done at your veterinarian's office — your dog's urine will be cultured and checked to insure urine specific gravity is below 1.030 (this number is found on the urinalysis results).

Struvite Stones

Struvite stones are also called triple phosphate and magnesium ammonium phosphate stones. Magnesium, ammonia and phosphate are common elements in urine. In high enough concentrations, they bind together to form crystals that can irritate and inflame the bladder.

When the crystals combine with mucus, they can form a plug that blocks the urinary tract. The crystals can also fuse together to form struvite stones.

The causes of struvite stones include extremely alkaline urine (often from a **biologically inappropriate diet**), high steroid use, abnormal retention of urine, a urinary tract infection or another disorder of the urinary tract. Some dogs with bladder stones show no signs, but common symptoms include:

- Frequent urination
- Straining to urinate
- An abnormal urinary stream (for example, the dog lifts his leg and only a few drops come out, and then a few drops more)
- Urinating in inappropriate places
- Cloudy or bloody urine

Increased thirst often goes hand-in-hand with bladder stones as well. As mentioned, urinary blockage is a medical emergency requiring immediate treatment.

This is seen much more often and is much more serious in males. If your dog isn't passing urine, you need to get him a veterinary clinic or emergency animal hospital right away.

The Role of Urine pH in Struvite Stone Formation

If there are crystals or stones that aren't completely blocking or occluding the urethra, making it possible for urine to pass, the situation can often be managed with medication and dietary adjustments.

The first thing to do for a dog struvite crystals or stones is to catch a sterile urine sample and submit it for a bacterial culture at your veterinarian's office.

Urinary infections must be cleared before struvite dissolution will be successful. The next step is to correct urine the urine pH. A pH of 7 is neutral. Everything above 7 is alkaline, and everything below 7 is acidic. Dogs should have a slightly acidic urine pH, optimally between 6 and 6.5.

We want to maintain the urine pH at no more than 7, because a higher pH will predispose your pet to developing struvite crystals.

Most pets with struvite crystals have a urine pH well above 7, which creates a perfect environment for bacterial proliferation as well as sediment to form in the bladder (often called "bladder sludge").

Buy pH strips from your vet or at the local drug store to check your dog's urine pH at home so you know when it's in or outside the desired range. In the morning prior to feeding your dog is when you should collect the urine sample because food profoundly alters urine pH throughout the day.

You can either hold the pH tape in the stream of urine while your dog is voiding, or you can catch a urine sample in a container and dip the tape into the sample to check the pH.

This should be done immediately with a fresh sample to insure accuracy. It's a good idea to keep a log of your pet's morning urine pH to show to your veterinarian at your appointments.

Reducing Urine pH with Dietary Adjustments

To reduce urine pH — which is the goal in most struvite stone situations — you must feed a low-carb, grain-free, potato-free and preferably fresh or at least canned diet for the increased moisture content. When dogs — who are designed to eat meat — are fed a grain-based or starch-rich diet, the starch alkalizes urine pH, which can lead to the development of stones.

Often, a dog's urine pH can be maintained naturally between 6 and 6.5, a good healthy range, on a species-appropriate diet. Dry pet food causes an increase in urine concentration, which can contribute to crystal and stone formation. In some cases your dog may need medical assistance in getting his urine pH down into a healthy range. This can be accomplished by adding the amino acid DL-methionine, in tablet or powder form.

This all natural ingredient is available to all veterinarians and is what is added to cheap, poor-quality veterinary diets to make them "prescription."

Avoid feeding these highly processed diets because they are made with feed grade (not food-grade or human-grade) rendered meat sources, unnaturally high amounts of grains and starches and synthetic nutrients imported from China.

You are much better off adding DL-methionine to a commercially available balanced and fresh food diet instead of being duped into buying these poor-quality foods. Ask your integrative veterinarian for dosing instructions. Creating more dilute urine by offering a moisture-rich diet is essential in preventing a recurrence of stones or crystals. This means there is not a kibble (dry food) on the market that effectively creates the dilute urine necessary prevent stones from forming.

A species-appropriate diet in combination with infection management is often effective at dissolving struvite stones, but it can take a few weeks to several months for the stones to completely disappear. It's important to note that some dogs are genetically predisposed to producing a protein called cauxin, which is excreted into the urine, causing sterile crystals or sterile struvite crystalluria. This means the crystals can form without the presence of infection.

These dogs are at increased risk for chronic cystitis (bladder inflammation) because the sharp crystals irritate the lining of the bladder, causing pain.

Holistic veterinarians often use traditional Chinese medicinals, homeopathy and nutraceuticals, including glucosamine and cranberry extract, to help reduce bladder inflammation in these patients. D-mannose can help prevent future infections once any current infection has been correctly identified and treated.

Some Struvite Stones Require Surgical Removal

Stones located in the urethra or the ureters (the tubes that connect the kidney to the bladder), typically must be removed surgically along with any stones that don't dissolve despite dietary changes and medical management. Surgery to remove a bladder stone is known as cystotomy. Depending on the patient and the location and size of the stone, there are some other less invasive procedures that might be appropriate.

If your pet has been diagnosed with struvite crystals or stones, it's imperative that you continue treatment until the condition is resolved, and then incorporate a proactive prevention plan to avoid recurrence. A urinalysis should be completed monthly until all the crystals are dissolved and then every six months to insure the problem isn't recurring.

Calcium Oxalate Stones

Over the past 15 years, the incidence of calcium oxalate (CaOx) stones in dogs has increased significantly, while cases of struvite stones have decreased.

There is a strong genetic component to the formation of oxalate bladder stones in dogs. A substance called nephrocalcin in urine naturally prevents formation of the stones, but in dogs who develop stones, the nephrocalcin is defective. Production of defective nephrocalcin may be inherited.

Metabolic diseases that may predispose a dog to develop stones include Cushing's disease and hypercalcemia, which is an elevated blood calcium level. A urine pH below 6 can also promote development of calcium oxalate stones.

Many commercially available, poor-quality pet foods also contain improper amounts of calcium and phosphorus, as well as other minerals that increase the risk for urinary crystals and stones. Combine these factors with a dry diet that's about 12% moisture (compared to the ancestral diet at 70% moisture, which is what pets should be eating) and you have the recipe for a calcium oxalate epidemic.

CaOx Stones Often Require Surgery

As is the case with struvite stones or any type of stone, the danger for a dog, especially a male dog with CaOx stones is obstruction of the urinary opening, which can cause life-threatening uremic poisoning. Again, if you notice your dog isn't passing urine, you should bring him immediately to your veterinarian or the closest emergency animal hospital.

Your veterinarian will try to dislodge the stone by flushing it back into the bladder, which if successful will also clear the urinary opening. If the stone can't be dislodged, the vet may need to create a new urinary opening. The urethra, a thin tube that carries urine out of the bladder during urination, is difficult to perform surgery on, so it's preferable to try to flush the stone back into the bladder for removal versus attempting to remove it from the urethra.

Calcium oxalate stones cause pain because they irritate the tender lining of the bladder. This usually causes bleeding, and also increases the likelihood of chronic bladder infections. Unfortunately, calcium oxalate stones can't be dissolved with a dietary change, so surgical removal is usually necessary. About half of dogs who undergo surgery develop new calcium oxalate stones within three years.

Tips for Preventing Calcium Oxalate Stones

A crucially important strategy in preventing CaOx stones in predisposed dogs is a diet that promotes less acidic, more dilute urine with a low urine specific gravity (less than 1.020). This means intentionally creating less concentrated urine by adding more moisture to your dog's diet.

Insure your dog is drinking plenty of clean, fresh water. You might want to consider providing a water fountain with continuously filtered, fresh and running water to encourage your dog to drink, along with placing bowls of fresh water in multiple locations around the house.

You can also add bone broth or low-sodium bouillon or stock to the water or food to entice your dog to consume more water. Definitely avoid kibble (it has an extremely low moisture content of 10% to 12%) and choose canned, raw or fresh food diets with more moisture.

In some cases, medications such as potassium citrate may be needed to increase the urinary pH. Adding alkalizing fruits and veggies to the diet can also keep urine pH in range. Vitamin B6 increases metabolism of glyoxylate, a precursor of oxalic acid, and may be of benefit. Check with your holistic veterinarian about the right dose of supplemental B6 for your dog.

Dogs prone to calcium oxalate stones should not be given calcium supplements or high-oxalate foods such as nuts, rhubarb, beets, green beans or spinach. More information about the oxalate content of foods can be found **here**.

Most conventional veterinarians recommend a commercial therapeutic diet for dogs with CaOx stones. My strong preference is an appropriate home-cooked diet, which you can create with guidance from a veterinary nutritionist at Balance IT or another similar resource (ask for species appropriate ingredients and no synthetics).

Herbs that may benefit bladder stones include chanca piedra, dandelion, goldenseal, horsetail, marshmallow, plantain, Oregon grape, uva ursi, yarrow, maitake mushrooms, corn silk powder and olive leaf. All dogs with any type of urinary crystals or stones should also be given a good-quality probiotic and omega-3 fatty acids, such as krill oil, which help reduce systemic inflammation in the body.

Regular Monitoring Is Very Important for Stone-Prone Dogs

Your veterinarian should perform routine monitoring of your dog's urine to look for any signs of bacterial infection. If bladder stones are present, bladder x-rays and urinalysis should be done a month after treatment and then every three to six months for the rest of your dog's life, depending on breed and genetic predisposition.

If your dog shows any urinary-related symptoms such as frequent urination, urinating in unusual locations, pain while urinating or blood in the urine, he should be seen by your veterinarian right away. Both struvite and calcium oxalate stones tend to recur despite the best prevention efforts.

Kidney and bladder stones can be very frustrating to manage. Not only do they often recur, but appropriate monitoring of your dog's health involves frequent veterinary visits. However, it's important to keep in mind that the risk and expense of surgery to remove a bladder stone is considerably more than the effort and cost of monitoring the condition closely.

Sources and References

[1] Whole Dog Journal, January 14, 2020

[2] Minnesota Urolith Center at University of Minnesota College of Veterinary Medicine