

Canine Urolithiasis & Compliance

Canine urolithiasis is not a single disease, but is often secondary to one or more conditions. Clinical signs of urolithiasis also may be the first indication of underlying systemic disease. When uroliths are diagnosed, the history and physical exam should focus on finding and eliminating any underlying condition that may predispose the dog to urolith formation.

KEY POINTS¹

- Urine is a complex solution containing a variety of substances that can inhibit or promote crystal formation.
- Urinalysis is one of the most important diagnostic tools for diagnosis and management of urolithiasis.
- There is no direct relationship between crystalluria and urolithiasis; however, detection of crystals in urine is proof that the sample is oversaturated with crystallogenic substances.
- Breed is an important risk factor in urolith formation.
- Struvite stones almost always indicate a bacterial infection in the genitourinary tract.
- Composition of uroliths varies but struvite, calcium oxalate, and ammonium urate are the most common.

Controlling or reducing the risk of urolith formation and recurrence requires good communication with the pet owner and frequent monitoring of the patient. Dogs with a history of urolithiasis should have frequent urinalysis and food compliance supervision. Key urinalysis factors include urine pH, specific gravity, and sediment. Urine samples should be examined within 30 to 60 minutes of collection to avoid pH drift and artifactual crystal formation.

URINE PH. Urine pH varies throughout the day and is influenced by the amount and type of food consumed. The lowest pH measurement typically occurs in a fasted sample. In general, struvite uroliths are associated with alkaline urine while calcium oxalate and ammonium urate uroliths are associated with acidic urine.

SPECIFIC GRAVITY. The normal urine specific gravity (USG) range is from 1.001 to 1.070 depending upon water and solutes needed by the body. Dogs at risk for urolithiasis should be encouraged to drink more water to keep urine dilute. Monitoring USG is also a way to monitor food compliance for some foods designed to decrease the risk of urolith formation.

SEDIMENT. Because crystals may precipitate out in stored urine samples, they must be examined immediately to correctly interpret findings. Although there is no direct relationship between urine crystals and urolithiasis, detection of crystals indicates a risk of urolith formation and suggests the need for preventive therapy if the dog has had uroliths previously or is an at-risk breed.

CASE STUDY

UROLITHIASIS Bitsy



Hx

- 5-year-old miniature schnauzer
- Spayed female
- BCS 4/5; overweight

Dx

- Polyuria; hematuria; urinary tract bacterial infection; urinary bladder stones

Rx

- Treat urinary tract infection; analyze stone; eliminate stones with urohydropropulsion

PROBLEM

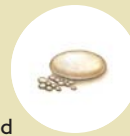
Urinary stone formation; bacterial urinary tract infection

SOLUTION

Please turn the page ...

RISK FACTORS FOR UROLITHS (Composition is verified by laboratory analysis.)

| Struvite | Calcium Oxalate | Ammonium Urate |
|--|---|--|
| Urinary tract infection Alkaline urine Female > Male Urine retention Low water intake Higher protein dog food At-risk breeds: Miniature schnauzer, miniature poodle, cocker spaniel, bichon frise | Older dog Acidic urine Male > Female Urine retention Low water intake Higher protein dog food At-risk breeds: Miniature schnauzer, miniature poodle, cocker spaniel, bichon frise, Shih Tzu, Lhasa Apso, Yorkshire terrier | Genetic/portovascular anomalies Acidic urine Male > Female Urine retention Low water intake Higher protein dog food At-risk breeds: Dalmatian, English bulldog, Yorkshire terrier |



SOLUTION

Bitsy's owner, Mrs. Morrison, noticed that Bitsy had blood in her urine. She took Bitsy right in to be evaluated by Dr. Parker at the Willowbrook Pet Clinic. Bitsy winced when Dr. Parker palpated her bladder and a small stone was expressed that was saved for evaluation by the Minnesota Urolith Center, (Quantitative urolith analysis conducted at no charge. Phone: 612-625-4221. Supported in part by an educational grant from Hill's®). A sample of urine was evaluated immediately and found to have a USG of 1.037, a pH of 8.5, struvite crystals, numerous white cells, blood, and bacteria.

Recommendation

Culture and sensitivity findings indicated a bacterial infection that was to be treated with specific antibiotics and more stones were confirmed by radiography. Because Bitsy had a history of pancreatitis and gastrointestinal upset, Dr. Parker decided against medical dissolution of the remaining stones and scheduled her for urohydropropulsion² (a technique that utilizes gravity and pressure during dilation of the urethral lumen while voiding) to eliminate them. The presence of struvite crystals in her urine at presentation indicated infection, but didn't confirm stone composition. With that in mind, Dr. Parker recommended a lower-calorie struvite-prevention food until the stone analysis was completed, at which time her treatment plan would be reevaluated.

- Hill's® Prescription Diet® Canine w/d® both canned and dry to be started immediately, mixed with water. Additional water bowls to be made available to Bitsy in the home to encourage more water consumption.

Acceptance

Madison, an RVT, showed Mrs. Morrison how to give the antibiotic to Bitsy. She told Mrs. Morrison that she would call to see how Bitsy was doing and she encouraged Mrs. Morrison to call if she had any questions. Madison also explained that the lower calorie food and more exercise could help Bitsy return to normal weight and went over a plan to transition Bitsy to the new food. Mrs. Morrison agreed to mix the new food with water as well as provide an extra water dish upstairs to encourage Bitsy to drink more.

Follow-Through

Bitsy was already enjoying the new food and was feeling much better when she returned. Follow-up radiographs showed that all of the stones had been eliminated during the urohydropropulsion. Lab results indicated calcium oxalate stones, but because Bitsy had both calcium oxalate stones and struvite crystals, Dr. Parker was unsure of the best nutritional approach. To assist him in planning the best course of therapy, he phoned the Hill's® Veterinary Consultation Service (1-800-548-VETS [8387]) and confirmed that Bitsy should continue to eat Canine w/d®, but that he should also prescribe potassium citrate (50-75 mg/kg Q 12 H added to Bitsy's food) to make her urine more alkaline. The compliance team at Willowbrook set up computer reminders for Bitsy's food and medication, as well as rechecks.

Outcome

Even though Bitsy has recovered from this episode, it will be important for her to continue on an appropriate food for the rest of her life and for Mrs. Morrison to bring her in regularly for rechecks. The goals are to keep Bitsy's urine pH around 7.0, her USG around 1.025, and ideally to get her weight back to normal. At her 1-month recheck, her urine pH was 7.5 at about 2 hours after a meal. The USG was 1.035 and there were no urine crystals noted on microscopic examination. With her increased activity, Bitsy had lost 1 pound, which put her a little closer to her optimum weight. Madison discussed the feeding and prescription protocol with Mrs. Morrison as well as ways to keep Bitsy's urine as dilute as possible and further reduce her risk of stone formation by having Bitsy continue to drink more water. Madison relayed that Dr. Parker had suggested Bitsy be radiographed every 6 months to check for the possibility of new uroliths and that her weight be monitored. The health care team will reevaluate Bitsy's food and prescription when she returns to a normal Body Condition Score (BCS).

REFERENCES

1. *Small Animal Clinical Nutrition*, 4th Ed. Hand MS, Thatcher CD, Remillard RL, Roudebush P (eds). Topeka, Kansas: Mark Morris Institute, 2000, pp 605-688.
2. **Voiding Urohydropropulsion: Lessons from 5 years of experience.** *The Veterinary Clinics of North America: The Rocket Science of Canine Urolithiasis.* Osborne CA, Lulich JP, Bartges JW (eds). Philadelphia: WB Saunders, 1999, pp 283-292.



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The doctor's recommendations could easily have overwhelmed Mrs. Morrison, and it is likely that she would not have been as successful in Bitsy's home care, much less remembered all of Bitsy's appointments, without Madison's help. This is an excellent example of the technician's important role in supporting the client with good "follow-through" (FT) and how the health care team can help improve patient care and compliance. Madison helped Mrs. Morrison with tips on administering Bitsy's medicine, transition to the new food, and increased water needs, and called her at home to see how Bitsy was doing and to give Mrs. Morrison the opportunity to ask questions. Finally, reminders for Bitsy's rechecks and 6-month radiograph appointments were entered into the computer to help Mrs. Morrison remember them. Follow-up appointments were also set up to track Bitsy's weight loss and to help Mrs. Morrison stick with the plan.

FORMULA FOR COMPLIANCE SUCCESS*

$$C = R + A + FT$$

C = Compliance standards of quality patient care

R = Recommendation & Reinforcement by health care team

A = Acceptance of protocol by owner

FT = Follow-Through by health care team

*See also, *Compliance in Companion Animal Practices*, © 2003 American Animal Hospital Association (info@aahanet.org), sponsored by an educational grant from Hill's Pet Nutrition, Inc.

