

Nutritional Assessment in a Dog with Urolithiasis

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Diet in Disease is a series developed by the WSAVA, the Academy of Veterinary Nutrition Technicians, and *Clinician's Brief*.



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THE CASE

Stella, a 4-year-old, 15-lb (6.8-kg), spayed terrier cross-breed was presented for intermittent hematuria and stranguria of a week's duration. She had been healthy previously and was up to date on vaccinations.

Physical examination revealed normal body temperature, heart rate, and respiratory rate. BCS was 5/9, and muscle condition was normal. She had a small, soft bladder and mild discomfort on caudal abdominal palpation. No urethral calculi were palpable on rectal examination.



Dietary History

Stella had been fed a commercial dry dog food, formulated to meet the nutrition requirements established by the Association of American Feed Control Officials Dog Food Nutrient Profiles for all life stages, in measured amounts according to package recommendations. She received occasional table scraps but no commercial treats or supplements.

Diagnostic Results

CBC and serum chemistry results were unremarkable. Urinalysis obtained via cystocentesis revealed a urine specific gravity (USG) of 1.052 (reference range, 1.015-1.050), a pH of 7.5 (reference range, 5.5-7.0), 51 to 100 cocci/hpf, 2 to 3 WBC/hpf, and 2 to 3 RBC/hpf. No crystalluria was observed. A urine sample was submitted for culture and antimicrobial susceptibility testing. Abdominal radiographs showed numerous round-to-ovoid-shaped, moderately radiopaque cystic calculi.

DIAGNOSIS:

BACTERIAL CYSTITIS & CYSTIC UROLITHIASIS

Infection-induced struvite urolithiasis was suspected based on the presence of bacteria and alkaline urinary pH. Female dogs are predisposed to UTIs.^{1,2} Uroliths of other composition (eg, calcium oxalate) were also considered because, although struvite uroliths are typically associated with UTIs in dogs, a sterile urolith of any composition may form primarily, serving as a nidus for secondary UTI. Most uroliths in dogs are of struvite or calcium oxalate composition.³

Treatment & Outcome

Medical dissolution is recommended as a first-line treatment for struvite uroliths.⁴ Thus, a veterinary therapeutic canned diet formulated for struvite dissolution was recommended for Stella. The owner was instructed to gradually introduce additional water to the canned diet as needed to achieve a goal USG of <1.020 and to discontinue table foods to maximize diet efficacy. Based on antimicrobial guidelines, initial therapy with amoxicillin (15 mg/kg PO q8h) was instituted while awaiting culture results.⁵

USG = urine specific gravity

Four days after initial presentation and initiation of amoxicillin therapy, final urine culture results were positive for *Staphylococcus* spp susceptible to several antibiotics, including amoxicillin. The owner was instructed to continue treatment with amoxicillin until urolith dissolution was documented, as bacteria in deeper urolith layers may be released during dissolution.⁶ The veterinary team confirmed with the owner that Stella had successfully transitioned to the recommended diet and that water was being added to the diet as instructed. Clinical signs started to improve with initial treatment.

At the 4-week follow-up appointment, the owner reported strict adherence to the recommended diet and resolution of lower urinary tract signs. Urinalysis showed a USG of 1.018, a pH of 6.3, and no crystalluria. Urine culture results were negative. Recheck abdominal radiographs showed a decrease in the number and size of uroliths, consistent with partial dissolution of struvite urolithiasis. The owner was encouraged to continue the diet and antibiotic treatment previously described.

At the 8-week recheck, continued owner adherence was confirmed. Stella remained clinically normal, and no uroliths were evident on abdominal radiographs. The owner was instructed to continue the therapeutic diet for 4 weeks before gradually transitioning to the previous maintenance diet, as most dogs with infection-associated struvite urolithiasis do not require long-term dietary therapy after successful dissolution. Twelve weeks after initial presentation, antibiotic therapy was discontinued. A final urine culture performed 13 weeks after initial presentation was negative.

Conclusion

In this case, a therapeutic diet in conjunction with antibiotic therapy was used to achieve resolution of urolithiasis without need for anesthesia and surgical removal. In addition to making a specific dietary recommendation, the veterinary team encouraged continued follow-up and verified the owner's adherence to recommendations at each recheck. Close monitoring and strict adherence were key to successful medical management of infection-induced struvite urolithiasis.

ASK YOURSELF ...

QUESTION 1

Which nutritional assessment should be performed as part of every physical examination?

- A. Weight
- B. BCS
- C. Muscle condition score
- D. All of the above

MOST ACCURATE ANSWER: D

A nutritional assessment should be performed as part of every physical examination. In addition to obtaining a dietary history, the veterinary team should also evaluate the patient's weight and weight trends, body condition, and muscle condition. The WSAVA Global Nutrition Toolkit (see **Suggested Reading**, next page) includes useful handouts and charts to facilitate nutritional assessments.

QUESTION 2

Which of the following parts of a patient's dietary history has the greatest potential cause for concern?

- A. Feeding a diet formulated to meet nutrient requirements for all life stages
- B. Feeding a large amount of home-cooked food or commercial treats
- C. Administering a multivitamin supplement
- D. B and C

MOST ACCURATE ANSWER: D

To avoid nutrient imbalance, treats and unbalanced foods should be limited to no more than 10% of daily caloric intake. This is particularly important to consider when attempting nutritional management of urolithiasis, as additional foods will decrease the efficacy of a therapeutic diet.

Clinicians should inquire about administration of dietary supplements while obtaining the dietary history. In patients being fed a complete and balanced diet, additional vitamin and mineral supplementation may be unnecessary and may lead to nutrient imbalance. In addition, supplements that contain stone precursors (eg, magnesium, phosphate, calcium, vitamin C) or that otherwise affect urine composition can interfere with a therapeutic diet's efficacy when being used for management of urolithiasis.

QUESTION 3

Which of the following antibiotics is recommended for the first-line treatment of simple UTIs?

- A. Amoxicillin
- B. Cefovecin
- C. Doxycycline
- D. Enrofloxacin

MOST ACCURATE ANSWER: A

Amoxicillin is recommended as a first-line treatment option for simple UTIs. Cefovecin should be reserved for cases in which oral medication may not be an option. Doxycycline is not recommended due to high intestinal metabolism and excretion and, potentially, low urine levels. Enrofloxacin should be reserved for treating resistant UTIs or pyelonephritis.⁵ Once medical dissolution of infection-induced struvite urolithiasis is implemented, antibiotic therapy should be continued until successful dissolution is achieved. See **Suggested Reading**, next page, for a review of recommendations regarding antibiotic choices for UTIs.

QUESTION 4

Which of the following stones can be dissolved with nutritional modification?

- A. Calcium oxalate
- B. Struvite
- C. Silica
- D. All of the above

MOST ACCURATE ANSWER: B

Nutritional modification can be used for medical dissolution of struvite, urate, and cystine uroliths. Prevention of struvite urolithiasis in dogs is generally focused on reducing risk factors for UTIs, except in rare cases of sterile struvite urolithiasis. Long-term dietary management is recommended to reduce risk for recurrence of other uroliths, including calcium oxalate, urate, cystine, and silica.

If Stella's urolithiasis and lower urinary tract signs had not improved with initial medical management, stone removal and analysis would have been indicated. Recommendations for long-term nutritional management would be indicated based on the results of stone analysis.

Continues ►

QUESTION 5

Which of the following nutritional modifications can be helpful in the management of struvite urolithiasis in dogs?

- A. Alkalinizing diets
- B. Leafy green vegetables
- C. Reduced dietary magnesium
- D. Dietary supplements containing vitamin C

MOST ACCURATE ANSWER: C

Diets formulated for dissolution of struvite urolithiasis in dogs have decreased concentrations of magnesium and phosphorus and have an acidic target urinary pH. There is some variation in protein concentration among products, but high protein concentrations should generally be avoided. Sodium content in dissolution diets can also vary depending on manufacturer and diet form (eg, canned vs dry).

Some leafy green vegetables (eg, spinach, Swiss chard) are high in oxalates and should be avoided in dogs with a history of calcium oxalate urolithiasis. In these dogs, avoidance of vitamin C supplementation is also recommended, as vitamin C is a metabolic precursor for oxalate. ■

References

- Hall JL, Holmes MA, Baines SJ. Prevalence and antimicrobial resistance of canine urinary tract pathogens. *Vet Rec*. 2013;173(22):549.
- Ling GV, Norris CR, Franti CE, et al. Interrelations of organism prevalence, specimen collection method, and host age, sex, and breed among 8,354 canine urinary tract infections (1969-1995). *J Vet Intern Med*. 2001;15(4):341-347.
- Lulich JP, Osborne CA, Albasan H, Koehler LA, Ulrich LM, Lekcharoensuk C. Recent shifts in the global proportions of canine uroliths. *Vet Rec*. 2013;172(14):363.
- Lulich JP, Berent AC, Adams LG, Westropp JL, Bartges JW, Osborne CA. ACVIM small animal consensus recommendations on the treatment and prevention of uroliths in dogs and cats. *J Vet Intern Med*. 2016;30(5):1564-1574.
- Weese JS, Blondeau JM, Boothe D, et al. Antimicrobial use guidelines for treatment of urinary tract disease in dogs and cats: antimicrobial guidelines working group of the International Society for Companion Animal Infectious Diseases. *Vet Med Int*. 2011;263768.
- Bartges JW, Callens AJ. Urolithiasis. *Vet Clin North Am Small Anim Pract*. 2015;45(4):747-768.

Suggested Reading

Weese JS, Blondeau JM, Boothe D, et al. Antimicrobial use guidelines for treatment of urinary tract disease in dogs and cats: antimicrobial guidelines working group of the International Society for Companion Animal Infectious Diseases. *Vet Med Int*. 2011;263768.

World Small Animal Veterinary Association Global Nutrition Committee. WSAVA Global Nutrition Toolkit. <http://www.wsava.org/nutrition-toolkit>. Accessed December 2018.

Prevention of struvite urolithiasis in dogs is generally focused on reducing risk factors for UTIs, except in rare cases of sterile struvite urolithiasis.

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5 mg, 10 mg, 30 mg, 60 mg and 120 mg strengths
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(trilostane)

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