

Protocol for Struvite Dissolution in Dogs and Cats

Jodi L Westropp DVM, PhD, DACVIM

This protocol is intended only as a guideline. For specific questions, please do not hesitate to contact the laboratory.



In dogs, virtually all struvite calculi are infection-induced and the causative organism is usually Staphylococcus intermedius or, less commonly, Proteus mirabilis or Klebsiella. These bacteria have the ability to hydrolyze urea into ammonia, bicarbonate, and carbonate. The resulting increase in the urine pH results in urinary supersaturation of the ions.

If a urolith is seen on radiographs, the following protocol can be attempted if surgery is not desired or is contraindicated.

1. Culture the urine
 - a. If a urease-producing bacteria is isolated, than it is likely that all or part of the stone is comprised of struvite.
 - b. Begin appropriate antibiotic based on urine susceptibility testing. ***The antibiotics should be continued throughout the entire dissolution trial.***
2. Begin a diet marketed to prevent struvite dissolution (*see below).
3. Re-evaluate the dog monthly with two-view radiography.
 - a. If the urolith has not decreased in size, several factors should be considered:
 - Were the owners compliant with the diet chosen? The urine pH should be < 6.5 and the urine specific gravity should be isosthenuric on these diets.
 - Were the owners compliant with the antibiotic chosen? Was the correct antibiotic chosen? A urine culture should be obtained.
 - If compliance is not an issue, the stone may contain minerals in addition to struvite in sufficient quantities to prevent dissolution
 - b. If the stone appears significantly smaller when reassessed, the diet and antibiotics should be continued until one month after radiographic resolution.

Contraindications for attempting struvite dissolution in dogs include:

1. Urethral obstruction
2. Discomfort for the dog
3. High risk for obstruction
4. Very young animals
5. Lactating animals

For cats, cystic struvite stones are suspected if there is a prior history of struvite urolithiasis, and/or if the urine pH is consistently > 6.7. Unlike dogs, cats rarely form struvite stones secondary to urease-producing bacterial urinary tract infections, so “guessing” the mineral content of the stone is not straightforward.

The dissolution protocol in the cat is similar to the dog, except antibiotics are not indicated. Radiographs should still be performed 3 to 4 weeks after the diet has been implemented. The urine pH should consistently be < 6.5 and the urine specific gravity should be isosthenuric. If radiographs indicate that the stone is significantly smaller, the diet should be continued and the cat reevaluated in another 3 to 4 weeks. If the stone appears significantly smaller when reassessed, the diet and antibiotics should be continued until one month after radiographic resolution.

Client information sheets regarding urolithiasis are available here:

http://www.vetmed.ucdavis.edu/vmth/small_animal/nutrition/client_info_sheets/uroliths.cfm

If you are a veterinarian and wish to discuss specific dietary recommendations for your case, please contact the G. V. Ling Urinary Stone Analysis Laboratory (530-752-3228 or stonelab@ucdavis.edu),

OR the UC Davis Nutrition Support Service (530-752-7892 or nssvetmed@ucdavis.edu)

http://www.vetmed.ucdavis.edu/vmth/small_animal/nutrition/index.cfm.

** As a public institution, UC Davis does not endorse any particular brand or type of pet food. The higher moisture content of canned formulations is helpful in stone prevention. Any dietary management plan should take into consideration concurrent diseases and other individual client and patient factors. **Dietary management plans for any patient that is overweight, or that has a low energy requirement, or that has any other concurrent disease should be individualized to optimize efficacy and avoid problems.***

*The reader is encouraged to discuss dietary strategy with a veterinary nutritionist; a **customized approach is often indicated.***

Canine diets for prevention of struvite urolithiasis: In most dogs, struvite urolithiasis is initiated by infection with urease-producing bacteria, and a change in diet for management of recurrence is not warranted. Guidelines for management of feline struvite urolithiasis are provided by the respective information sheet.

Commercially Available Diets Marketed for Struvite Dissolution in Dogs and Cats:

1. Hill's Prescription Diet Canine s/d canned and Feline s/d canned and dry:

These diets are very protein restricted and are *inappropriate for long term feeding*. During the dissolution process, the patient should be closely monitored to ensure safe and effective use of the diet. These diets are contraindicated during growth, pregnancy or lactation, and are not for use in dogs and cats with chronic kidney disease or with fat intolerance, or for dogs with sodium intolerance.

2. Royal Canin Veterinary Diet Canine Urinary SO canned and dry and Feline Urinary SO canned and dry:

These diets are adequate for canine and feline maintenance, respectively, but are contraindicated during growth, pregnancy or lactation, and are not for use in dogs and cats with chronic kidney disease or with fat or sodium intolerance.