Canine Struvite Urolithiasis Management

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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.

After the stone(s) is (are) removed or dissolved (see "dissolution" protocol), perform two view abdominal radiographs to ensure no small cystic or urethral calculi remain.

1. Submit the stones to the G. V. Ling Urinary Stone Analysis Laboratory for quantitative crystallographic analysis.

2. Obtain a urine culture and sensitivity.
   a. Appropriate full-dose antimicrobial therapy should be administered for at least two weeks. An antibiotic that is both bactericidal for the expected pathogen and readily excreted in the urine should be chosen. A urine culture should be performed five to seven days after completion of the antibiotic course.
   b. If the urine is sterile, another urine culture is advised in four to six weeks. If the urine remains sterile, periodic urine cultures are recommended. This can be done 2 to 3 times per year or as dictated by the clinician.
   c. If a relapsed infection or re-infection is documented, a search for underlying causes of UTIs should be performed. The dog should be evaluated for a recessed vulva, persistent uroliths, cystic polyps, neoplasia, and immune disorders, in addition to other contributory factors.
   d. In some cases, even after correction of predisposing factors, long-term antibiotic therapy is required to maintain sterile urine.
      i. After a full course and dose of an appropriate antibiotic is administered for 4-6 weeks, consider daily prophylactic therapy or pulse dose therapy. There are no studies in dogs evaluating these types of regimens. Periodic urine cultures are advised during and after this protocol (every two to three months).

3. Dietary changes are typically not necessary to prevent recurrence in dogs with struvite uroliths secondary to infections.*
4. Increased water intake to result in a urine specific gravity of <1.020 is recommended for those rare dogs which form struvite uroliths in the absence of infections. A diet that promotes urine acidification (pH 6.2-6.4) may also be of benefit, but there is scant evidence for this strategy. Contact the laboratory for more information. 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.*
   a. It is unknown if added fluid intake will benefit or harm a dog with urinary tract infections.
   b. After three to four weeks on the new diet, the urine should be evaluated for specific gravity, pH, crystals and bacteria. Schedule periodic reevaluations monthly until the desired urine pH and specific gravity is consistently maintained. Oftentimes, a urine sample can be collected in the home environment and submitted. The urine should be very fresh (evaluated within 30 minutes) for sediment examination.

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

* 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.