UCDAVIS VETERINARY MEDICINE

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Urate urolithiasis in Dogs and Cats

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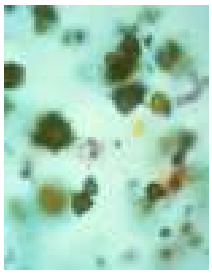
This protocol is intended only as a guideline. For specific questions, please do not hesitate to contact the laboratory.



Dalmatians are at risk for the development of urate uroliths because of a genetic defect in the hepatic and renal uric acid transporter (SLC2A9 transporter) which results in hyperuricosuria and hyperuricemia. The defect is a simple autosomal recessive trait for which all Dalmatian dogs are homozygous. English Bulldogs, Parson Russell Terriers and Black Russian Terriers also appear to be predisposed to urate stone formation. Some members of these breeds have also been reported to be homozygous for the same mutation in SLC2A9. There is a DNA test to confirm the defect in individual patients. More information is available at the following website: http://www.vgl.ucdavis.edu/services/Hyperuricosuria.php.

Other breeds typically develop urate-containing uroliths as a result of liver disease, namely portosystemic shunts. Surgical correction of the underlying problem and eliminating the hyperuricosuria can prevent urate stone formation in some dogs with portal vascular anomalies. Allopurinol is generally not recommended in dogs with portovascular anomalies, because of alterations in metabolism of this drug.

Portovascular anomalies appear to be an uncommon cause of urate stone formation in the cat. In most cases, the cause is unknown; however, genetics may be involved, since a few breeds such as the Siamese and Egyptian Mau have been reported to be predisposed to urate uroliths.

Recommendations:

Any dog or cat with urate stones and clinical signs or blood work suggestive for a portovascular anomaly should be further evaluated with testing such as bile acids, abdominal ultrasound, and/or a technetium scan. Dogs with urate stones with no known genetic predisposition for urate stones should also be evaluated for underlying liver abnormalities.

Management of urate urolithiasis in Dalmatians and other breeds with a genetic predisposition for urate stone formation:

1. Submit the stones to the G. V. Ling Urinary Stone Analysis Laboratory for quantitative crystallographic analysis.
2. Submit a urine culture and sensitivity, and initiate appropriate antibiotic therapy if indicated. If an infection is documented, it is usually secondary to the presence of the stone. Unlike struvite urolithiasis, infections do not induce urate stone formation.

3. If no underlying liver abnormalities are documented, begin an appropriate diet that is **high in moisture*. Dilute urine and frequent urination** is critical for managing patients with any type of urolithiasis.
    a. Canned diets are usually easiest; however, the patient can also be fed a dry diet mixed with water on a 1 to 5 volume basis. The water should be added gradually over 3 to 4 weeks so diarrhea does not develop.
    b. For dogs, a diet low in purine content should be fed. This can be accomplished by feeding a diet low in protein and/or by feeding a diet with low-purine protein sources.
    c. To prevent recurrence of urate stones in otherwise healthy cats, a high moisture diet that is restricted in protein is often recommended (ie., diets formulated for liver disease or kidney disease). A commercially available hydrolyzed soy protein (low purine) diet has also been used; evidence of the effectiveness of this approach has not been published.
4. Reevaluate in 4 to 6 weeks and regularly thereafter to monitor specific gravity and presence of crystals.
    a. If specific gravity is not <1.020 for dogs (<1.025 for cats), add more water to the diet.
    b. Urine pH should be approximately 7.5 to increase the solubility of urate stones. Potassium citrate can be added if necessary.
    c. Perform periodic ultrasounds. If small cystic calculi are noted, consider voiding urohydropropulsion to remove them. Always submit any new stones for quantitative crystallographic analysis. *This is particularly important for dogs receiving allopurinol as xanthine stones can occur.*
5. If recurrence is a problem in dogs without underlying liver disorders, despite appropriate USG and pH, consider the xanthine oxidase inhibitor, allopurinol. This drug should only be administered to dogs consuming a purine-restricted diet. The recommended starting dose is 5-10 mg/kg PO BID. Ideally, the dose should be titrated based on 24-hour uric acid excretion; contact the laboratory for more information. We do not routinely use allopurinol in our feline patients.

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 ucdstonelab@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****. There are large variations in the nutritional profiles of various diets marketed for urolithiasis management (see list below), while many other diets can be effectively used 'off-label' for this purpose.*

Commercially Available Diets Marketed for Management of Canine Urate Urolithiasis:

1. Hill's Prescription Diet Canine u/d canned and dry
2. Royal Canin Veterinary Diet Canine Urinary UC Low Purine dry
3. Royal Canin Veterinary Diet Canine Vegetarian canned and dry

4. Purina Veterinary Diet HA Hypoallergenic Canine Formula dry
5. Hill's Prescription Diet Canine d/d Rice and Egg dry

Commercially Available Diets Marketed for Management of Feline Urate Urolithiasis:

1. Purina Veterinary Diet NF Kidney Function Feline Formula canned and dry
2. Hill's Prescription Diet l/d Feline canned and dry
3. Hill's Prescription Diet k/d Feline canned and dry
4. Royal Canin Veterinary Diet Feline Hypoallergenic HP dry
5. Royal Canin Veterinary Diet Feline Modified LP canned and dry
6. Iams Veterinary Formula Multi-Stage Renal Feline canned and dry