

Renal & Urinary Disorders

Canine Struvite Urolithiasis



Struvite is one of the two most common uroliths in dogs as it is in cats. Unlike cats in which most struvite uroliths are sterile, struvite uroliths in dogs are typically associated with urinary tract infections (UTIs) caused by urease-producing bacteria, such as *Staphylococcus pseudointermedius* or *Proteus mirabilis*. The bacteria break down urea, which ultimately leads to a rise in urine pH and the release of ammonium, which together promote production of struvite uroliths. In combination with appropriate antibiotic therapy, nutrition can help dissolve struvite uroliths. Since findings of struvite crystalluria can occur incidentally, especially when urinalysis is delayed after collection of urine, these findings should be considered in the context of whether clinical and radiographic signs are present.

Key Messages

- Since the majority of struvite uroliths in dogs are associated with UTIs caused by urease-producing bacteria, treatment with antibiotics (chosen based on culture and sensitivity) is critical. Control of infection is key to prevent recurrence of uroliths. Therapeutic urinary diets may be used to enhance or quicken elimination of uroliths. Once the uroliths dissolve completely, the diet usually is not continued long-term.
- Therapeutic urinary diets can help manage canine struvite urolithiasis by:
 - creating an acidic urine, which helps dissolve struvite uroliths
 - providing controlled levels of magnesium and phosphorus, components of struvite uroliths
- Adding water to the diet may help increase total water intake and urine volume, promoting a more dilute urine. A more dilute urine contains a lower concentration of urolith precursors. A higher urine volume may also increase frequency of urination, helping eliminate precursors before they can form uroliths.
 - Promotion of a more dilute urine is recommended for the management of any uroliths.
- The purpose of the therapeutic diet and dilute urine is to produce urine undersaturated for struvite as calculated by RSS (relative super-saturation) technology, a measure of the likelihood of urolith formation. This reduces the likelihood for uroliths to form and helps to dissolve existing struvite uroliths.
- In the rare case of sterile struvite urolithiasis in a dog, the therapeutic urinary diet may be fed long-term after dissolution of existing uroliths to help prevent recurrence.

Additional Resources

Palma, D., Langston, C., Gisselman, K., & McCue, J. (2013). Canine struvite urolithiasis. *Compendium: Continuing Education for Veterinarians*, 35(8), E1.

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Weese, J. S., Blondeau, J., Boothe, D., Guardabassi, L. G., Gumley, N., Papich, M., Jessen, L. R., Lappin, M., Rankin, S., Westropp, J. L., & Sykes, J. (2019). International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats. *The Veterinary Journal*, 247, 8–25. doi: 10.1016/j.tvjl.2019.02.008

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