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Canine Struvite Bladder Stones

What are Struvite Bladder stones:

Canine struvite bladder stones are formed from crystals composed of Magnesium, Ammonium, and Phosphate. Triple Phosphate crystals are another term for struvites. Struvite crystals are only present in an alkaline pH urine sample. Since normal pH of urine tends to be more alkaline (7-7.5 pH), some struvite crystals are not uncommon in a normal sample of urine and usually do not cause any harm, but when in large quantity these crystals will start forming stones. Also coinciding with struvite crystals is bacteria so we would generally say “No bacterial infection, no bladder stones.”

When to suspect bladder stones:

Some patients are non-symptomatic when it comes to bladder stones. For those patients that do show symptoms, they can have bloody urine, recurrent bladder infections caused by the same bacterial organism, and straining and increased frequency of urination. When bladder stones are suspected a urinalysis and some radiographs can be done to help with the diagnosis. Occasionally a patient may pass a small stone when urinating, if this should happen a radiograph should be taken to make sure there are no further stones present. Bladder stones are not limited to Struvite crystals, they can also be Oxalate crystals, but oxalate crystals are formed from different compounds and so, the approach to treat each is different. A diagnosis can be confirmed if there is a sample stone (either passed by urination or retrieved by surgical removal) that is sent off to a laboratory analysis.

How to decide: Struvite vs. Oxalate:

If a stone analysis is not able to be done an educated guess is better than nothing, and other methods can be done to help diagnosis. Struvite stones usually occur because of the changes caused by specific types of bladder infections, a *Staphylococcal* infection or occasionally a *Proteus* infection. If a urine culture is done and either of these bacteria grows then struvite crystals are more likely to be present than oxalate. Another indicator for struvite would be a urine pH that is alkaline versus a urine pH that is acidic. If the urine is acidic then the chances are greater that the crystals are oxalate. However, a complete analysis (urine and stone) is needed to prevent a reoccurrence.

Treating Struvite Bladder Stones:

There are three different ways of treating bladder stones. There is surgical removal (cystotomy), a special technique which is known as “voiding urohydropropulsion” method. The third method for treating struvite crystals would be dissolving them by means of a special diet.

- 1) **Surgical removal** is the quickest and most direct route of removing stones. There are some disadvantages to the surgical method such as anesthetic risks, post-operative pain, the risk of contaminating the abdomen with infected urine, and the chance that not all the

stones may be removed (to small or difficult to retrieve), all of these complications are considered minor from a “cystotomy” or surgical removal of stones, and are very unusual.

- 2) **Voiding urohydropropulsion** is a technique for small stones that may be urinated out. The bladder is filled with some sterile fluid, and then the bladder is agitated to get the stones/sediment floating about. The final step for this method is to create a high pressure stream of urine to force stones out of the urethra. More often than not this is a method that may need to be done several times to ensure that a reoccurrence of stones will not happen.
- 3) **Dietary Dissolution** is the last method to treating struvite bladder stones. These diets are considered prescriptions and are decided based on the diagnosis of Struvite crystals. Antibiotics may be necessary in congruence with the diet to get rid of the bacteria that is released when the stones start to dissolve (bacteria is encrusted in the crystals). One of these prescription diets used is S/D diet ® manufactured by Hills. This diet may not always appeal to your animal but it is important to make sure it is the only food fed to your pet during the dissolution process. The dissolving itself can take up to 3 and a half months, so the food should be given at least a full month after the stones are no longer detected by radiograph. Along with the diet radiographs should be taken monthly to ensure the stones are being properly dissolved. S/D should not be continued as a regular diet after the stones have been dissolved, and should not be fed for longer than a 6 month period. S/D is also a high salt, high fat diet, so it should not be fed to patients prone to pancreatitis, heart disease, kidney disease or high blood pressure.

Treating struvites with a diet is not as important as focusing on the prevention of an infection. There is an exception for those dogs that form struvite stones metabolically. If your pet has a known history of struvite bladder stones, make sure you and your veterinarian discuss a long term treatment plan for them.

Canine struvite bladder stones occur on average in patients who are between the ages of 2 -3 years of age, but this does not mean dogs that are older can not get them. Certain breeds are at higher risk for the formation of struvite stones, these breeds include beagles, miniature schnauzers, and English cocker spaniels, but other breeds as well as mixed breeds can form struvite stones as well.