CANINE CALCIUM PHOSPHATE CARBONATE UROLITHS
Like struvite, calcium phosphate carbonate forms as a consequence of urinary tract infection with bacteria that produce the enzyme urease. Uroliths recur when urinary tract infections are inadequately prevented.

Calcium phosphate carbonate commonly forms in breeds that are also at risk for calcium oxalate uroliths (Shih Tzu, Bichon, miniature Schnauzer, etc.). We hypothesize that increased calcium excretion in combination with urinary tract infection are important risk factors for calcium phosphate carbonate. Therefore, avoid prevention therapies that increase the risk for calcium oxalate (i.e. do not overly acidify urine).

PREVENTION

** We advise reviewing manufacturer’s literature regarding selected therapeutic foods to determine indications and contraindications. For pets with multiple health concerns, we suggest that the selection of diet should take into consideration all health needs of the pet.

Indepth recommendations and references are available on our website: urolithcenter.org under the resources tab.
CANINE CALCIUM PHOSPHATE CARBONATE UROLITHS

Uroliths composed primarily of calcium phosphate carbonate are uncommon. However, this mineral in small quantities is commonly associated with uroliths composed of struvite because both minerals form as a consequence of urinary tract infection with bacteria (e.g. Staphylococcus sp. & Proteus sp.) that produce urease. When urease hydrolyzes urea, carbonates are formed and urine pH increases; both are risk factors for calcium phosphate carbonate precipitation. Although struvite is readily amenable to medical dissolution, calcium phosphate carbonate appears less amenable to a similar dissolution protocol. It may be possible that struvite uroliths that contain smaller amounts of calcium phosphate carbonate, (e.g. less than 30% in any layer) can be medically dissolved by protocols designed for struvite dissolution (see recommendations for Canine Struvite Uroliths at www.urolithcenter.org).

Calcium phosphate carbonate uroliths primarily form in female dogs (72%) presumably because females are at greater risk for urinary tract infections than male dogs. We have also recognized that breeds that form calcium phosphate carbonate uroliths (Shih Tzu, Bichon, miniature Schnauzer, etc.) are similar to those at risk for calcium oxalate uroliths. Therefore, we hypothesize that increased calcium excretion in combination with urinary tract infection with bacteria that produce urease are important risk factors favoring calcium phosphate carbonate urolith formation.

PREVENTION

MEDICAL CONSIDERATIONS

AMOXICILLIN

Penicillins are usually effective against the most common urease producing bacterium (i.e. Staphylococcus sp.).

NUTRITIONAL CONSIDERATIONS

CANNED FOODS FOR SENIOR DOGS

Foods for older dogs that are lower in protein, phosphorus, and calcium (<5g, <170mg, <140mg per 100 kilocalories, respectively), which do not promote acidic urine are usually associated with decreased calcium and phosphorus excretion.

MONITORING CONSIDERATIONS

URINE CULTURE

Periodic urine cultures for aerobic bacteria to detect recurrent infections before urolith recurrence.
PREVENTION OF CALCIUM PHOSPHATE CARBONATE UROLITHS
Monitor: Urine culture (± urinalysis) in 1 month and then every 3 to 6 months
Consider medical imaging every 6 months, or sooner in patients with recurrent urinary signs

Positive Culture
- Repeat Culture and UA every 3 to 6 months.
- Repeat culture with any signs of emerging infection (e.g. excessive licking of vulva, urinating in house, pollakiuria, hematuria, etc.)

Negative Culture

Calcium Oxalate Crystalluria
- Consider type of therapy based on urolith location and prediction of mineral type.
- Submit retrieved uroliths for quantitative mineral analysis.

Uroliths
- Verify persistent, in vivo crystalluria by reevaluating an appropriately collected (in hospital) fresh urine sample analyzed within 30 minutes
- If persistent and in breeds at increased risk for CaOx uroliths (Bichon, Miniature schnauzer, Yorkshire terrier, Shih Tzu, Lhasa Apso, others), discontinue any diets that promote formation of acidic urine and consult dietary and non-dietary recommendations for calcium oxalate prevention

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