MINNESOTA UROLITH CENTER
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CANINE CALCIUM PHOSPHATE CARBONATE UROLITHS IN DOGS

Like struvite, calcium phosphate carbonate forms as a consequence of urinary tract infection with bacteria that produce the enzyme urease. Preventing urinary tract infection is the primary method to prevent calcium phosphate carbonate urolith recurrence.

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).

MINIMIZING RECURRENCE

DIAGNOSTIC CONSIDERATIONS	MEDICAL CONSIDERATIONS	NUTRITIONAL CONSIDERATIONS	MONITORING CONSIDERATIONS
Identify and eradicate structural and functional risk factors for recurrent infections. Culture the urine.	Culture and susceptibility testing provides the most accurate method for selecting effective antimicrobials. Penicillins (e.g. amoxicillin) are usually effective against the most common urease producing bacteria (i.e. Staphylococcus sp.)	Canned foods for older dogs which are lower in protein, phosphorus, and sodium (<5.5g, <170mg, <150mg per 100 kilocalories, respectively), that do not over-acidify urine (e.g. Hill's g/d, c/d Multicare, Science Diet Mature Adult Gourmet Turkey or Beef Entrée, other diets promoting urine pH≥6.5)	Periodic urine cultures (e.g. every 3 months) to manage recurrent infections before uroliths recur.

** Review manufacturer's therapeutic food literature to determine indications/contraindications. For pets with multiple health concerns, consult a veterinary nutritionist to select an optimal food.

Support from Hills Pet Nutrition, veterinarians, and pet owners make our work possible.

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CANINE CALCIUM PHOSPHATE CARBONATE UROLITHS IN DOGS

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 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.

MINIMIZING RECURRENCE

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 sodium (<5g, <170mg, <150mg per 100 kilocalories, respectively), which do not promote acidic urine are usually associated with decreased calcium and phosphorus excretion.

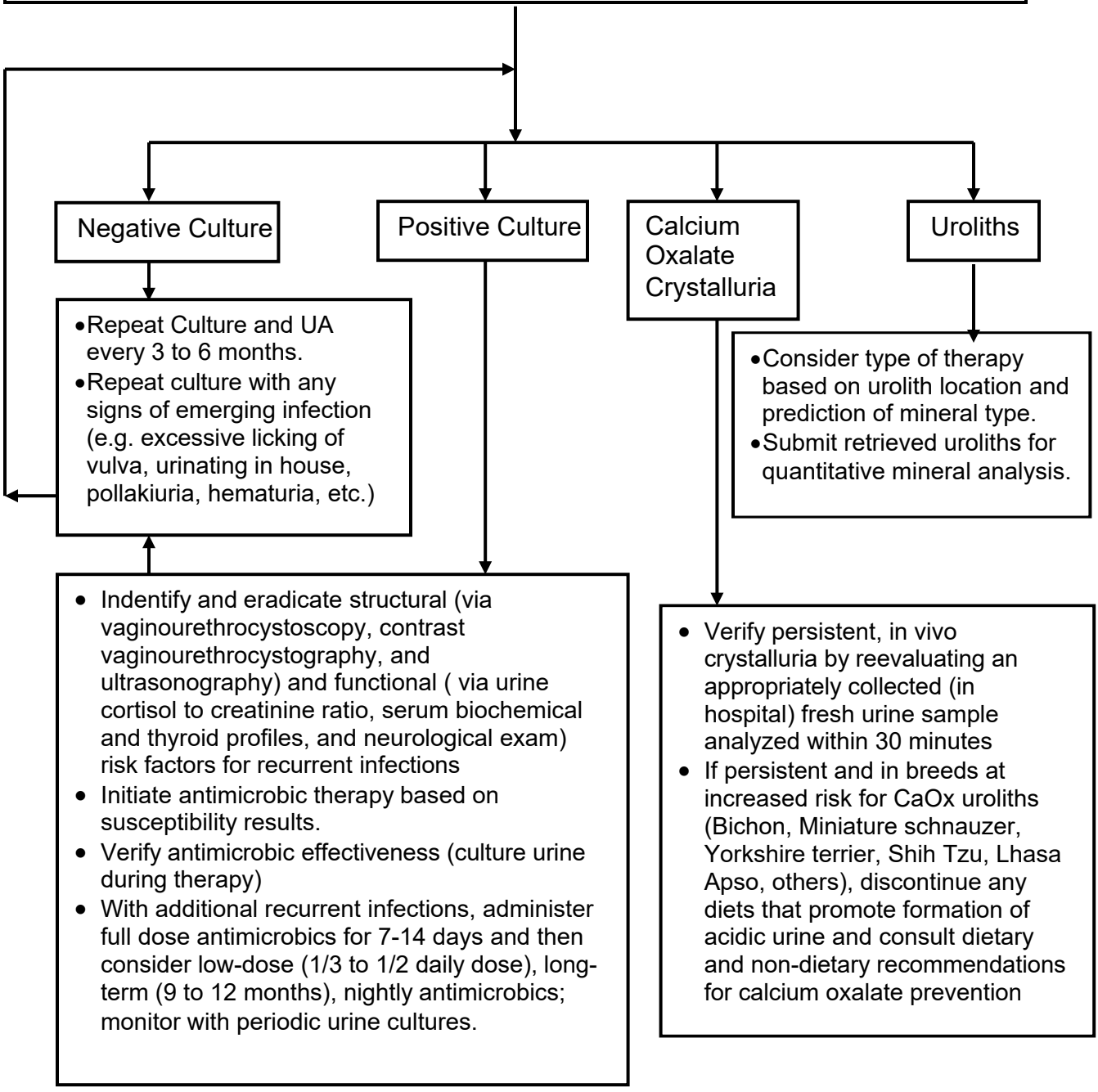
MONITORING CONSIDERATIONS

URINE CULTURE

Periodic urine cultures for aerobic bacteria to detect recurrent infections before urolith recurrence.

PREVENTION OF CALCIUM PHOSPHATE CARBONATE UROLITHS IN DOGS

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



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