MINNESOTA UROLITH CENTER
UNIVERSITY OF MINNESOTA
College of Veterinary Medicine • 1352 Boyd Avenue • St Paul MN 55108
Phone 612.625.4221 • Fax 612.626.3226 • support@urolithcenter.org
Directors: Jody P Lulich, DVM, PhD • Eva Furrow, VMD, PhD

FELINE STRUVITE UROLITHS - Risk Management

In almost all cats, struvite (magnesium ammonium phosphate hexahydrate) forms without a urinary tract infection (i.e. sterile struvite uroliths). Culture urine prior to antibiotic administration if you suspect infection (urease-producing bacteria) as the cause of struvite formation.
Information about Feline Struvite Dissolution.

MINIMIZING RECURRENCE

DIAGNOSTIC CONSIDERATIONS	MEDICAL CONSIDERATIONS	NUTRITIONAL CONSIDERATIONS	MONITORING CONSIDERATIONS
Culture urine.	Urine Culture and susceptibility testing provides the most accurate method for selecting an antimicrobic if needed to manage infection-induced struvite uroliths.	Foods with lower phosphorus and magnesium that promote formation of acidic urine (e.g. Hill's c/d multicare, w/d, others).	Repeat urinalyses every 6 months and medical imaging annually. Culture urine every 3-6 months for infection-induced struvite uroliths.

** 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.

MINNESOTA UROLITH CENTER
UNIVERSITY OF MINNESOTA
College of Veterinary Medicine ★ 1352 Boyd Avenue ★ St Paul, MN 55108
Phone: 612.625.4221 ★Fax: 612-626-3226 ★ support@urolithcenter.org
Director: Jody P Lulich, DVM, PhD ★ Founder: Carl A Osborne, DVM, PhD

FELINE STRUVITE UROLITHS

Cats between 2 to 10 years old are at greatest risk for struvite urolith formation.[1] Although common in the urinary bladder, struvite is rare in the kidney. By reducing urinary phosphorus, magnesium, and pH, therapeutic foods are very effective at dissolving and preventing sterile struvite uroliths in cats.

Medical Considerations:

- Sterile struvite uroliths are common in cats. If urinary infection is considered, avoid empiric antimicrobics and culture urine first.
- Metabolic risk factors promoting alkalemia (renal tubular acidoisis, hypoxemia, chronic diuretic use, administration of antacids, chronic vomiting, and hyperaldosteronism) and subsequent alkalinuria are rarely diagnosed.

Nutritional Considerations:

- Diets restricted in phosphorus and magnesium that promote formation of acid urine (i.e. pH≤ 6.4), minimize formation of sterile struvite uroliths.
- Extreme and prolonged reductions of some risk factors to minimize struvite urolith formation, including formation of acidic urine, may increase risk for calcium oxalate urolith formation. Therefore, we do not recommend long-term feeding of foods promoting urine pH < 6.2. [1]
- High moisture foods (i.e. canned formulations) may be more effective because increased water consumption is associated with decreased urine concentrations of calculogenic minerals and increased crystal evacuation. With persistent struvite crystalluria, feed canned foods and/or add increasing amounts of water to food until specific gravity is less than 1.030.

Pharmacological Considerations:

- Consider methionine or ammonium chloride to acidify the urine of patients consuming alternative diets that do not promote urine acidification.

Consider These Facts:

Some veterinarians prefer to remove struvite stones surgically instead of medical dissolution due to the perception that medical dissolution is less effective, more expensive, associated with prolonged discomfort, and will be associated with urethral obstruction as uroliths decrease in size.. These are misperceptions. Medical dissolution of sterile struvite uroliths was not associated with increased expense, urethral obstruction, or increased discomfort, and was more effective than surgery.[2,3,4] Medical dissolution is an effective and compassionate choice for cats without a urethral obstruction.

Dissolution of sterile struvite uroliths with Prescription Diet® c/d® Feline pet food was 100% effective; in as quick as 7 days (range 7-52 days).[4] Prescription Diet® c/d® Multicare Feline is a maintenance food specially formulated for long-term feeding. Consider feeding the maintenance food formulated to prevent struvite uroliths until cats are at least 9-10 years old and older if needed.[1]

Struvite is the most common mineral in urethral plugs; following retropulsion or removal of urethra plugs feed therapeutic maintenance foods formulated to dissolve struvite to prevent reobstruction.

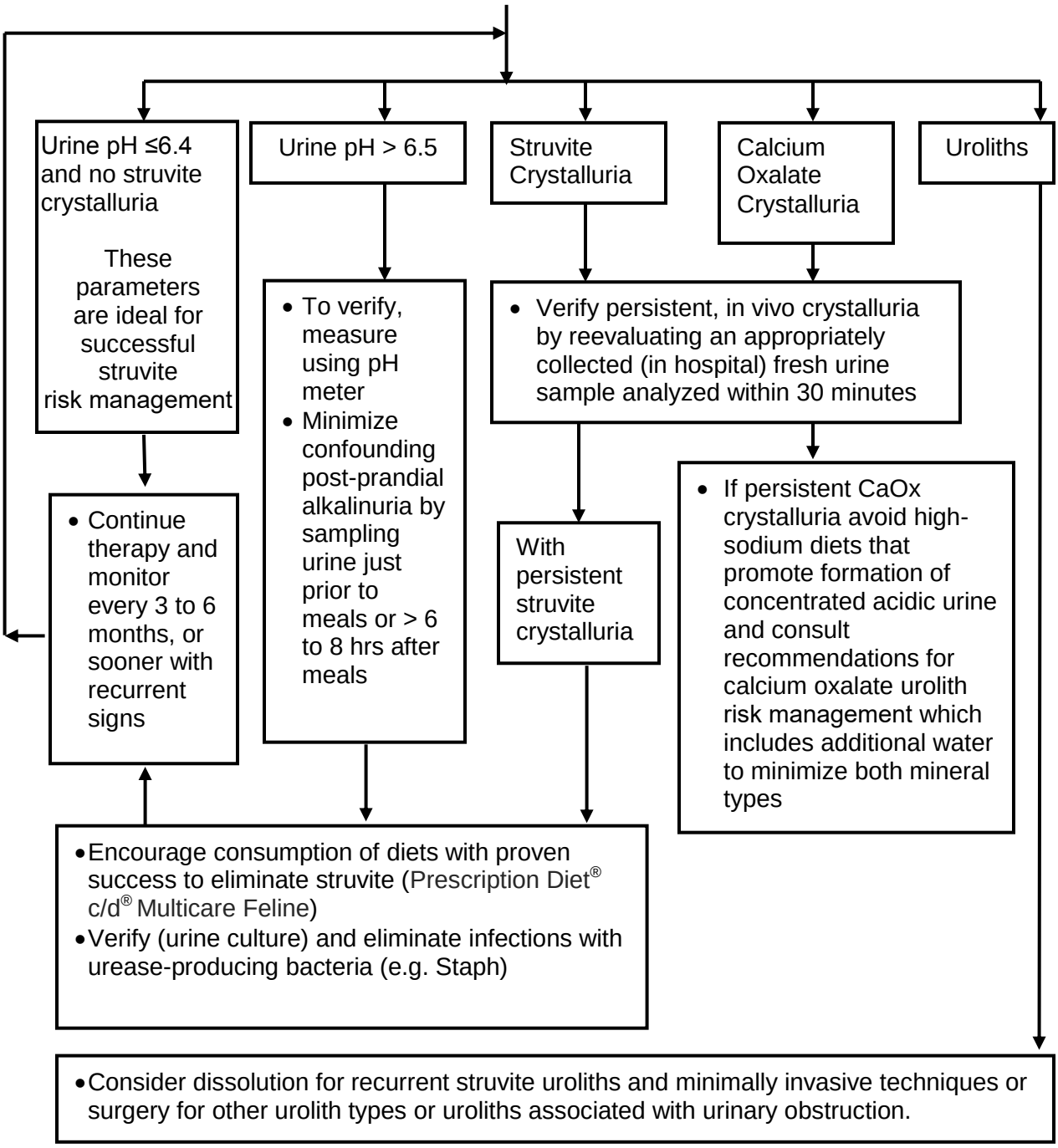
Struvite crystalluria is common in cats with idiopathic cystitis. To eliminate risk for urethral obstruction, urolith formation, and bladder irritation from larger crystal aggregates; feed therapeutic maintenance foods formulated to dissolve and prevent struvite.

1. Lekcharoensuk C. Association between patient-related factors and risk of calcium oxalate and magnesium ammonium phosphate urolithiasis in cats: JAVMA 2000; 217: 520.
2. Osborne C. Medical dissolution of feline struvite urocystoliths: prospective clinical study of 30 cases. JAVMA 1990;196:1053.
3. Houston D. Evaluation of efficacy of a commercial diet in the dissolution of feline struvite bladder uroliths. Vet Ther 2004;5:187.
4. Lulich et al. Efficacy of two commercially available low magnesium, urine acidifying dry foods for the dissolution of struvite uroliths in cats.JAVMA 2013;243:1147.

FELINE STERILE STRUVITE UROLITHS RISK MANAGEMENT

Therapy: Long-term use of a struvitolytic maintenance diet with reduced levels of phosphorus and magnesium that promote formation of acidic urine (e.g. Prescription Diet® c/d® Multicare Feline fits these criteria).

Monitor: Urinalysis in 1 month and then every 3 to 6 months
Medical imaging every 6 to 12 months



** 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.

FELINE INFECTION-INDUCED STRUVITE UROLITH RISK MANAGEMENT

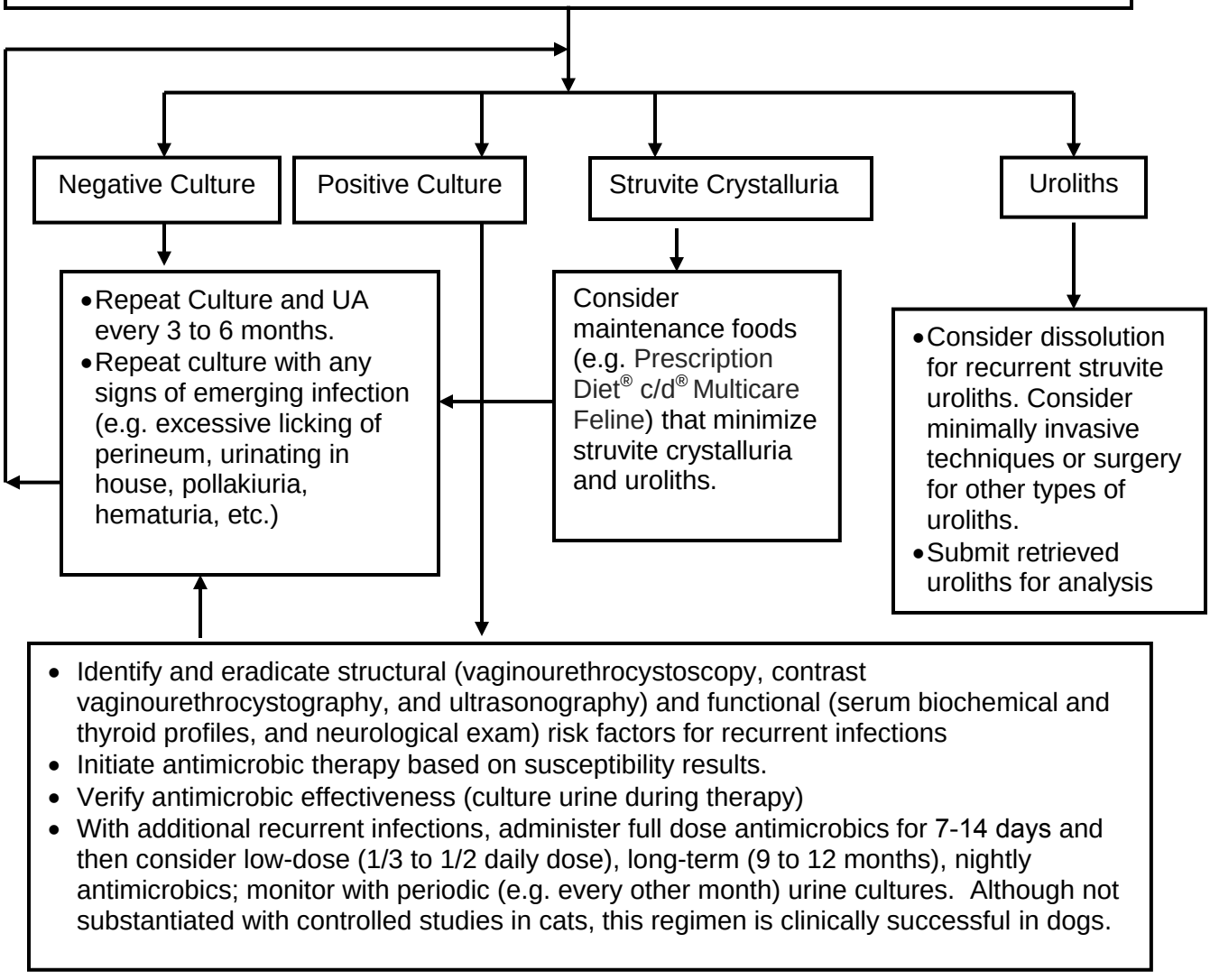
Infection-induced struvite uroliths are uncommon, except in cats with perineal urethrostomies or systemic immunosuppression. Do not confuse infection-induced struvite uroliths which are often caused by Staphylococcus sp., with UTI's secondary to urolithiasis which are often caused by bacteria other than Staphylococcus sp.

Therapy:

1. Antimicrobials: When needed, antimicrobics should be selected on the basis of culture and susceptibility results
2. Diet: When needed, consider foods with reduced phosphorus and magnesium that promote formation of acidic urine (e.g. Prescription Diet® c/d® Multicare Feline fit these criteria). Therapeutic foods are helpful, but cannot be used as a substitute for appropriate control of urinary tract infections.

Monitor:

1. Urine culture and urinalysis in 1 month and then every 3 to 6 months
2. Consider medical imaging every 6 months, or sooner in patients with recurrent urinary signs.



** 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.