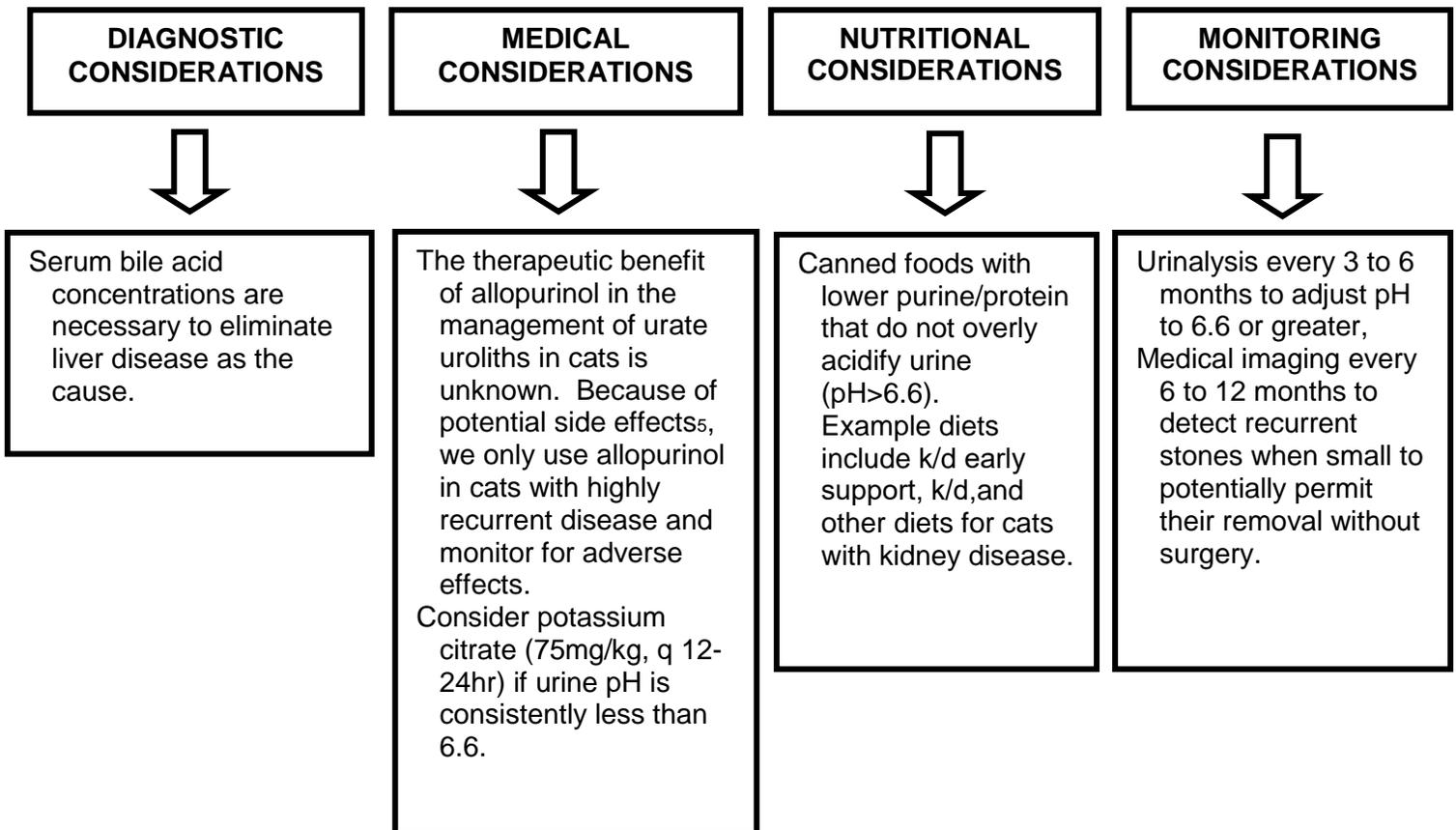




## FELINE URATE

The primary etiology underlying ammonium urate uroliths in most cats is unknown. Although portovenous anomalies have been identified in some, this abnormality is uncommon. Small quantities of urate (10% or less) can be admixed with struvite and/or calcium oxalate, and until proven otherwise, is not considered clinically important when developing a treatment plan.

### MINIMIZING RECURRENCE



\*\* 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 AMMONIUM URATE UROLITHS

Ammonium urate uroliths represent approximately 5% of all feline uroliths submitted to our center.<sup>1</sup> The causes underlying ammonium urate urolith formation in most cats are unknown. Although portovascular anomalies have been identified in some, this abnormality is uncommon. Protocols designed to consistently dissolve ammonium urate uroliths in cats have not yet been developed. Minimally invasive procedures or surgery remain the most reliable methods to remove active uroliths from the urinary tract.

### Minimizing Urate Urolith Recurrence

#### Medical considerations:

- Although uncommon, portovascular anomalies have been documented in association with urate uroliths in a few cats.<sup>2</sup> Therefore, serum bile acid testing is recommended.
- Treatment of uroliths should complement, and not supersede appropriate management of liver disease.

#### Nutritional considerations:

- Feed diets with lower quantities of high-biological-value protein; lower protein is often synonymous with lower purine.
- Consider diets that promote formation of urine with a pH of 6.6 or greater.
- High moisture foods (i.e. canned formulations) are more effective because increased water consumption is associated with decreased urine concentrations of calculogenic minerals.
- Feed canned foods and/or add increasing amounts of water to food to promote less concentrated urine.

#### Pharmacological considerations:

- The therapeutic benefit of allopurinol in the management of urate uroliths in cats is unknown. Because of potential side effects<sup>5</sup>, we reserve the use of allopurinol for cats with highly recurrent disease and monitor for adverse effects (in humans dermatological hypersensitivity, renal disease and liver disease have been reported).
- Consider potassium citrate (75mg/kg, q 12-24hr) if urine pH is consistently less than 6.6.

### Consider These Facts:

- Urate crystalluria is not commonly observed in cats. In a 2007 study at the University of Minnesota, neither urate nor amorphous urate crystals were observed in cats with ammonium urate uroliths.<sup>3</sup>
- Urate uroliths are typically radiolucent<sup>4</sup>. In a 2007 study at the U of MN, only 2 of 6 cats had uroliths sufficiently radio-opaque to be detected by survey radiography<sup>3</sup>. Contrast cystography or ultrasound are necessary to consistently visualize urate uroliths in the urinary tract.
- We have successfully dissolved ammonium urate uroliths in 2 cats with a combination of allopurinol (15mg/kg PO q12 hr in one cat, and 15 mg/kg PO q24hr in the other) and canned Prescription Diet® k/d® Feline.<sup>3,5</sup>
- In a retrospective study, urate urolith recurrence was detected in 13% of cats; recurrent uroliths were detected  $1.8 \pm 1.0$  years following initial removal.<sup>6</sup> Compared to uroliths composed of struvite or calcium oxalate, the recurrence rate was greatest for urate.
- In an in vitro study, the most effective urine pH to prevent ammonium urate formation was 6.6.<sup>7</sup> Prescription Diet® k/d® Feline is formulated to produce urine with a pH of 6.6 to 6.9. To minimize dietary purines Prescription Diet® k/d® Feline contains relatively lower levels of high quality protein.<sup>8</sup>

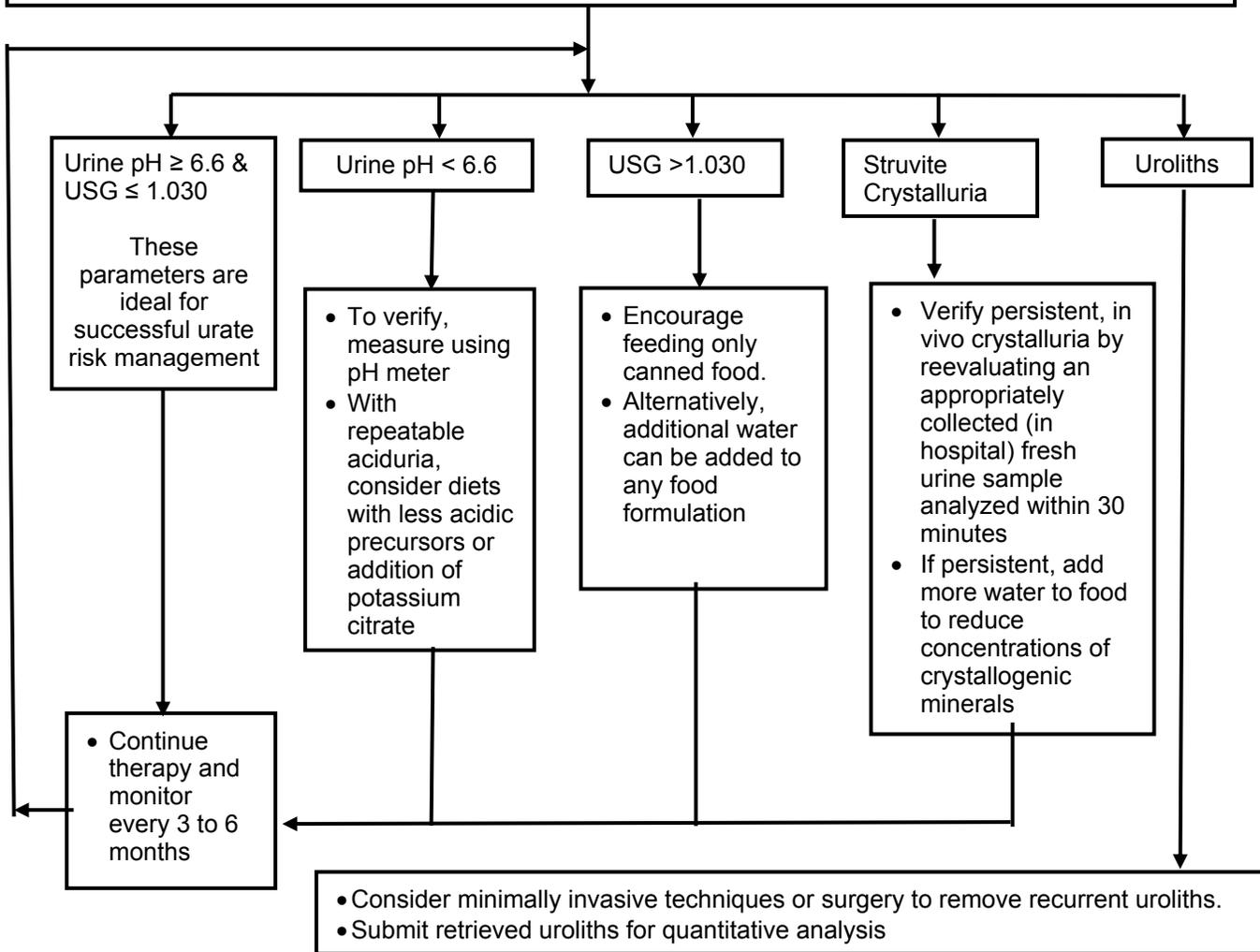
## FELINE AMMONIUM URATE RISK MANAGEMENT

### Therapy:

- Correction of portovascular anomalies, when diagnosed, appears logical. However, further studies are needed to determine the efficacy of hepatic vascular restoration on urate urolith recurrence.
- Consider diets with reduced protein (and therefore reduced purines) that promote formation of urine with a pH  $\geq 6.6$  (e.g. Prescription Diet<sup>®</sup> k/d<sup>®</sup> Feline fits these criteria)

### Monitor:

- Urinalysis in 1 month and then every 3 to 6 months
- Consider appropriate 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.**

<sup>1</sup>Osborne CA: Epidemiology of Feline Uroliths and Urethral Plugs; Update 1981-2009. DVM Newsmagazine 360. June 2010.

<sup>2</sup>Brown JC: Complex Extrahepatic Portocaval Shunt with Unusual Caval Features in a Cat: Computed Tomographic Characterisation: JSAP 2010; 51:227.

<sup>3</sup>Gnanandarajah JS: Purine Uroliths. Consultations in Feline Internal Medicine 2010:499.

<sup>4</sup>Lulich JP: Changing Paradigms in the Diagnosis of Urolithiasis. VCNA 2008; 39:79.

<sup>5</sup>Osborne CA: Diagnosis, Medical Treatment, and Prognosis of Feline Urolithiasis. VCNA 1996;26:589.

<sup>6</sup>Albasan H: Rate and Frequency of Recurrence of Uroliths After an Initial Ammonium Urate, Calcium Oxalate, or Struvite Urolith in Cats. JAVMA 2009; 235:12: 1450

<sup>7</sup>Teotia M, et.al: crystallization of ammonium acid urate and other uric acid derivatives from urine. British Journal of Urology. 1971;43:381.

<sup>8</sup>[www.hillsvet.com](http://www.hillsvet.com)