

PUTTING THE BRAKES ON FELINE AND CANINE LOWER URINARY TRACT DISEASE

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“A well-defined problem is half solved.” If we do not ask the right questions of our clients, perform physical examinations that are problem specific, select tests that are likely to reveal a cause, or treat without adequately making a diagnosis, we may remain trapped by our misconceptions and ineffective in our administration of care. The following will help you make smart and strategic decisions in the diagnosis and management of lower urinary tract disease.

Preventing Feline Idiopathic Cystitis

Idiopathic cystitis is characterized by lower urinary tract signs (pollakiuria, stranguria, periuria, and hematuria) that often resolve spontaneously within 4 to 7 days with or without treatment, and are likely to recur. Although our understanding of the pathogenesis of idiopathic cystitis has improved, the underlying cause remains unknown. A diagnosis of FIC can only be made once other common causes for dysuria (stones, behavioral urination, infection, cancer) has been eliminated. Goals for managing cats with idiopathic cystitis are to decrease the severity of clinical signs and to increase the interval between episodes of lower urinary tract signs. This can be facilitated by educating owners about known factors involved in the pathogenesis and outcomes of idiopathic cystitis, and implementing therapies to mitigate them.

Therapeutic Target	Therapy
Acute Pain (85-90%)	Buprenorphine: 0.02-0.03mg/kg SL q8-12h Gabapentin 5-10mg/kg q12h
Recurrent Episodes of dysuria-up to 65%/1-2yr (Kruger 2003)	Therapeutic foods (c/d multicare®) reduced recurrent episodes of FIC by 89% compared to a typical grocery store food (Kruger 2015) Environmental Enrichment and Stress Reduction reduced recurrent episodes of FIC by 72% , but since this study had no control (comparison group), we cannot determine how this compares with a placebo. (Buffington 2006). Canned therapeutic food reduced recurrent episodes of FIC by 28% compared to dry therapeutic food (Markwell 1989)
Life threatening Urethral Obstruction-up to 73% (Defauw 2011)	Similar to above for recurrent episodes of dysuria. Potential urethral

	obstruction is an indication to prescribe foods that minimize struvite crystals which is a common component of urethral plugs.
Chronic Pain (10-15%)	Gabapentin 5-10mg/kg q12h

Dissolve Feline Struvite Uroliths: Take The Challenge:

Should surgeon-minded veterinarians attempt medical dissolution when stones are rapidly dissolvable? Stone analysis at the Minnesota Urolith Center indicates that this is not happening. In 2018, 49% of the 17,294 feline submissions were struvite. In a clinical trial of 32 cats without urinary obstruction, complete dissolution of urocystoliths was achieved in 27 ± 2.6 (mean $\pm$ SD) ; range = 7 to 52 days with a therapeutic dry food providing maintenance nutrition requirements (Prescription Diet c/d Multicare Feline Bladder Health) with no adverse effects (e.g. no urethral obstruction, food aversion) and at a fraction of the cost of surgical cystotomy. Here is the challenge: the next cat with bladder stones consistent with a composition of struvite (moderately radio dense), start therapeutic dissolution therapy (c/d multicare or s/d food). Repeat the lateral radiograph in 14 to 21 days. If the stone is smaller or dissolved continue the therapy. The cat and owner will thank you (in 2018 more than 8000 cats received unnecessary surgery). If the stone is unchanged, it is likely not struvite and requires removal (cystotomy, percutaneous cystolithotomy, laser lithotripsy) and submit for analysis.

Three Steps to Prevent Canine Calcium Oxalate Uroliths

Calcium oxalate (CaOx) is the most frequent canine urolith submitted for analysis in most countries of the world. In most cases, the cause is idiopathic and treatment success is unpredictable. However, several simple strategies will help minimize recurrence and when they do recur these strategies will allow you to avoid surgery.

1. Hire a reliable surgeon-20% of recurrences are pseudo-recurrences, the stones were not completely removed the first time (Grant 2010). Ten percent of recurrent stones have a suture nidus (Appel 2008). When performing a cystotomy, minimize placing suture in the urinary bladder.

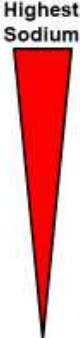
2. Over achieve urine goals-neutral urine with less calcium that is less concentrated reduces calcium precipitation.

2a. Dietary sodium promotes calcium excretion. Therefore avoid diets with excessive sodium. This is also important because the same ages and breeds associated with calcium oxalate are also at risk for mitral valve disease. Excess sodium in these dogs may promote cardiac damage and hypertension. Do you know the sodium content of the diet that you feed?

2b. Add water to food until the urine specific gravity is consistently below 1.020.

2c. Prescribe potassium citrate (products without cranberry) to neutralize the urine and complex calcium.

Sodium Content of Therapeutic Foods to Prevent CaOx



Food	Kibble or Canned	Sodium mg per 100 Kcal	Calcium mg per 100 Kcal
Purina UR St/Ox	Kibble	330	300
Royal Canin SO	Kibble	300	180
Royal Canin SO	Canned	200	200
Purina UR St/Ox	Canned	130	170
Hills c/d mcare	Canned	64	176
Hills c/d mcare	Kibble	61	156
Hills u/d	Canned	61	76
Hills u/d	Kibble	52	75

3. Image often. Consider medical imaging every 6 months to diagnose urolith recurrence when stones are small and can be removed by voiding urohydropropulsion (Lulich 1999).

Unobstructing the Feline Urethra

Urethral re-obstruction is the most common complication of unobstructing the feline urethra. Re-obstructions may result in euthanasia, increased expenses and further damage to the urinary tract. Minimizing re-obstruction starts with gentle, thoughtful care during the initial unobstruction. The tools to safely unobstruct the feline urethra and minimize reobstruction are provided.

Tool	Remarks	Jury
Sedation	Sedation should be considered for cats in discomfort. It facilitates physical examination, decompressive cystocentesis, IV catheter placement and reduce anxiety. Butorphanol (0.2 to 0.3 mg/kg IM) with Midazolam (0.2 mg/kg IM) is a suitable start. Not necessary in moribund cats.	Yes
Decompressive Cystocentesis	The benefits of cystocentesis can be lifesaving (correction of metabolic wastes including hyperkalemia and acidemia, reduced discomfort, decreased resistance to retrograde urethral flushing, and collection of a clean urine sample for analysis). Yet many practitioners	Yes

	avoid cystocentesis because of the fear of bladder rupture. Recent studies show that rupture is unlikely. 45 obstructed cats ultrasounded before and 15 min after cystocentesis found a scant amount of abdominal fluid in 15 cats before, and an additional 7 after cystocentesis; none had a ruptured bladder (Cooper 2013). In 47 obstructed cats radiographed after cystocentesis and catheterization, 57% had loss of peritoneal effusion but none had bladder rupture (Hall 2015). In a large study of 557 cats, 5 (1%) had a ruptured bladder but it was not stated if it happened spontaneously, following cystocentesis or following urethral catheterization (Hetrick 2013)	
Pursue a Diagnosis Before Treatment	It is perplexing as to why so many cats with urethral obstruction are catheterized before an underlying cause is pursued (Eisenberg 2013). Knowing the cause would 1. Confirm the diagnosis, 2. Determine the best strategy to stabilize cats (decompressive cystocentesis or urethral catheterization), 2. Determine when to unobstruct (before or at correction of the underlying cause), 3. Determine how to unobstruct (flush or force), 4. Select how long to leave the catheter in (1 day or longer), 5. Determine follow-up care (surgery or not).	Yes
Sufficient Anesthesia	Adequate anesthesia to unobstruct the urethra is crucial to avoid iatrogenic urethral trauma and urethral spasms. Many protocols are available (Ketamine (2 to 4 mg/kg IV, Diazepam (0.2 to 0.3 mg/kg) or midazolam (0.1 to 0.2 mg/kg) IV, and Acepromazine (0.05 mg/kg IV); inhalant anesthesia instead of IV). Use propofol (0.5 to 1 mg/kg IV) to top off regimens that are not blocking urethral contractions. Avoid protocols that potentially increase urethral tone (i.e. Dexmedetomidine, an α_2 agonist (Aro 2015)).	Yes, but avoid dexmedetomidine
Flush do not force catheters	Passing catheters proximal to stones or through persistent intraluminal obstructions may damage the urethra. Clear the urethral lumen prior to passing a catheter into the urinary bladder.	Yes
Extend the	The feline urethra has a flexure which needs	Yes

distal urethra caudally while passing catheter	to be straightened to facilitate flushing and passage of urethral catheters. If not extended caudally, urethral flushing can be ineffective or catheters can be passed through the wall at the flexure.	
Minimize dwelling time of indwelling catheters	For idiopathic obstruction and urethral plugs most catheters are only needed for 24 hours. However, catheters should be left in longer to clear azotemia, allow detrusor repair or to allow the underlying cause to resolve.	Yes
Intravenous fluid support	Intravenous fluid support is considered important to support cardiovascular function, assist renal clearance of excess wastes and electrolytes, and flush precipitates out of the urinary bladder. Balanced electrolyte fluids assist rapid return of acid-base abnormalities.	Yes
Therapeutic diets	Re-obstruction is a consideration for euthanasia, increased expenses and further damage to the urinary tract. Therapeutic diets are highly effective in preventing idiopathic cystitis, struvite urethral plugs, struvite uroliths, struvite crystalluria (Osborne 1991. Lulich 2013, Bell 2015, Kruger 2015).	Yes
Antispasmodics	There is little evidence to support a beneficial impact of urethral relaxants in the management of urethral obstruction. A double-blinded, placebo-controlled prospective study failed to demonstrate that prazosin (0.25mg/cat q 12 hr) made a difference in recurrence rate (Reineke 2017). It is important to know that this drug and others that decrease tone work on the proximal urethral which is not the site of disease. A better approach would be to <u>gently</u> unobstruct the urethra to minimize irritation. Drugs working on the distal urethral have not been evaluated; however in a study of 6 cats with obstruction, urethral pressures on average were not increased (Streater-Knowlen 1995).	No, unless catheterization induced trauma
Antibiotics	Studies indicate that at the time of urinary catheterization no first time obstructed cat was infected (Cooper 2013, Hugonnard 2013). However 13 to 33% develop infections following catheterization. These findings indicate that antibiotics should be withheld until urinary catheters are removed and the urine cultured. If empirical antibiotics are	No, or ultra-short term following catheter removal.

	prescribed prior to culture results, they should be given short term since removal of the catheter is removing the cause for infection.	
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