

Pacific Tide

An informational newsletter

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About our Author

Chris Robison, DVM

Dr. Robison received his Doctorate in Veterinary Medicine from UC Davis in 1995, and completed his internship the following year at Santa Cruz Veterinary Hospital. He remained in Santa Cruz in general practice until 1998 when he became one of the vanguard of doctors who began at PVSES. Dr. Robison is known for his great and abiding love and advocacy for *all* creatures, as well as for his exceptional skills and wide-ranging knowledge in emergency medicine.

In Dr. Robison's free time he enjoys spending time with his wife and two sons. He loves riding his mountain bike in the Santa Cruz mountains and on any trail he can find. He also loves to snow ski, cook and garden. He shares his life with an assortment of dogs, cats, chickens and a horse.



**Chris Robison,
DVM
Emergency Medical
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The Blocked Male Cat

By C.A. Robison, DVM

Urethral obstruction in male cats is an extremely common, frequently straight forward but at times frustrating syndrome. The possible causes are many and can be obvious but often are difficult to identify. The following discussion includes information I found to be interesting and practical, hope it aids in providing the best possible care for our patients. The discussion just touches on a more comprehensive literature of this very complicated and often multifactorial syndrome.

Urethral obstruction in male cats represents up to 9% of our feline patients which present on emergency. This disease predominately affects overweight, often indoor, castrated male cats with 73% between the ages of 2 and 8 years. The possible causes of urethral obstruction are many but the vast majority will present as the result of feline lower urinary tract disease (FLUTD) or feline idiopathic cystitis (FIC). Cats which present with a different signalment should raise suspicion for an etiology other than FLUTD. Struvite crystalluria is present in varying degrees of severity in 90% of the cases that we see, the incidence of oxalate crystals has been on the rise for the last twenty years but remains the cause for less than 1% of blocked cats. Explaining why particular cats are affected to owners is not easy to do. The mainstay of long term management is dietary so one would infer that the previous diet was the culprit. Diets vary greatly in form, quality and content and are likely a major component in this process but many other factors such as stress, access to water, age and body condition all play important roles.



Cats with severe and prolonged urethral obstruction present depressed and dehydrated and rarely present with signs easily referable to the urinary tract. The minimum pretreatment database should include serum electrolytes, ECG and a lateral abdominal radiograph, which includes the entire penile urethra. Samples should be obtained for a complete chemistry panel, CBC, urinalysis and urine culture and susceptibility.

Hyperkalemia

Hyperkalemia represents an immediate, life threatening condition but classic arrhythmias are often not seen at all or are seen at unexpected potassium concentrations. Hypercalcemia, acidosis and hypermagnesemia can interact with potassium or can directly affect ECG results. Bradycardia may or may not be present, even in the face of severe hyperkalemia, and should not be relied upon to assess the severity of the patients condition. Because this is a potentially deadly problem measure serum potassium levels in all patients with urethral obstruction.

Emergency treatments for hyperkalemia;

Definitive treatment for hyperkalemia involves the reestablishment of urine flow. It is up to the clinician's discretion if other treatments are initiated prior to deobstruction. Decompressive cystocentesis could be performed but should only be considered if a delay in urethral catheter placement is expected as there is a risk of iatrogenic uroabdomen. Intravenous fluids decrease the serum potassium by dilution and increased excretion through the kidneys by increasing GFR when urine flow resumes. The importance of, at times aggressive, use IV fluid therapy cannot be over emphasized not only to help correct hyperkalemia but also to correct dehydration, hypovolemia and hypotension. Other methods for addressing hypercalcemia include:

10% Calcium gluconate

0.5 to 1.0 mg/kg

give IV slowly over 10-15 minutes while monitoring ECG for any new arrhythmias

does not lower serum potassium

the effects last about 30 minutes

Dextrose alone, stimulating endogenous insulin production and intracellular shift of potassium
0.5 to 1.5 g/k IV

Dextrose with regular insulin

0.5 units regular insulin/kg IV
follow with dextrose CRI
2g dextrose/unit insulin administered
effects are transient and can redoes, if necessary

Sodium bicarbonate

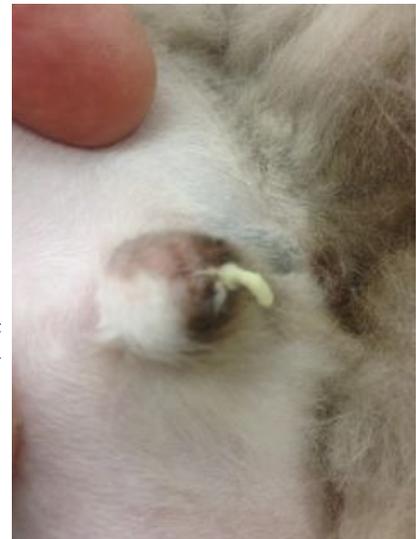
$\text{mEq HCO}_3^- = 0.3 \times (\text{wt in kg}) \times (\text{desired HCO}_3^- - \text{measured HCO}_3^-)$
give 0.25 to 0.33 of the calculated amount IV and recheck serum potassium levels and pH before administering additional dose(s) to avoid alkalosis and hypokalemia
give each dose slowly for 15 minutes

All the above treatments decrease serum potassium levels or decrease the affects of hyperkalemia but the administration of sodium bicarbonate is associated with the greatest risk of iatrogenic complications and therefore should be reserved for use in patients with severe acidosis (i.e. pH < 7.1).

Post obstructive diuresis (POD)

POD is a well recognized complication and more often occurs in patients with prolonged obstruction. Its occurrence cannot be predicted but has greater frequency in cats with an initial pH of <7.35, and in up to 46% of patients, generally, it is observed within 6 hours of deobstruction. POD generally continues for 24-48 hours but can be present for up to 72 hours.

Treating post obstructive diuresis begins with recognizing its occurrence. If unrecognized, POD can result in severe dehydration, hypovolemia and shock. All patients should have closed urine collection systems, measurements of urine output every 4-6 hours, the urine production per hour is calculated and intravenous fluid rates are adjusted each 4-6 hour period to match urine output. High rates of fluid administration (at time up to 100 ml/hr for an average sized cat) may be required and continued until POD has resolved. Criteria for resolution of POD is 1) the volume of urine production and IV fluid administration are equal and 2) when the volume of IV fluids administered is reduced the volume of urine produced over the same period is also reduced.



Urethral spasms

In many cases urethral spasms occur resulting in functional urethral obstruction. This is characterized by stranguria with little or no urine production and the concurrent inability to express the bladder. Urethral edema and inflammation occur secondary to the primary disease process, catheterization and the presence of a urethral catheter and can result in spasms of the smooth and skeletal muscle along the entire length of the urethra.

Treating urethral spasms primarily involves the use of prazosin (0.25 to 0.5 mg orally q 12 to 21 hours), a selective alpha 1 agonist and phenoxybenzamine (1.25 to 5 mg orally twice a day), a nonspecific alpha antagonist. The feline preprostatic urethra is composed of smooth muscle whereas the postprostatic urethra is composed primarily of striated muscle. Prazosin and phenoxybenzamine's effects are limited to smooth muscle and clinical studies do not support the efficacy of these medications but they are commonly used in clinical cases. When used in sensitive cats and at higher doses they can both cause hypotension with the risk of hypotension being greater with the use of prazosin. Netiehr should be used in hypovolemic and/or hypotensive cats. Experimental evidence suggests that the use of dantrolene, a skeletal muscle relaxant, may reduce urethral tone in cats.

No published studies have supported the use of glucocorticoids or NSAIDs in reducing urethral inflammation and edema. Adverse effects of these drugs in hypovolemic and azotemic patients have been well documented and there is

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no good support for the use of these drugs in cases of urethral obstruction. Some research indicates the incidence of kidney infections increases in cats with indwelling urinary catheters given steroids implying it is contraindicated.



Reobstruction

Overall reobstruction rates within the initial 24 hours was 10.94% and was 23.57% within 30 days. A reduction of reobstruction rates were seen with the use of parzocin (7.14% at 24 hours, 18.18% at 30 days) when compared to phenoxybenzamine (21.74% at 24 hours, 39.02% at 30 days). Reduced recurrence rates were seen with the use of 3.5 french urethral catheters (6.67% at 24 hours) over the use of 5 french urethral catheters (18.97% at 24 hours). There was no significant association with the duration of catheterization, the use of antibiotics, the use of meloxicam or the consistent use of pain medication in the rates of reobstruction.

More information to consider

For me, management of urethral obstruction has evolved to limit the size of urethral catheter to 3.5F, to use parazocin over phenoxybenzamine and to question the need for urethral catheters in all patients. Patients with no gross discoloration of urine, minimal amounts of mucus or sediment in the urine and no azotemia should be considered as candidates for management without a urethral catheter following deobstruction.

I have no personal experience with a protocol proposed by Cooper et al in 2010 which received a fair amount of publicity. While the study was valid, it should be considered with extreme caution and only applied to a specific population of cats:

- conventional management has been declined
- no severe metabolic derangements
- no urinary calculi

Patients were kept in a quiet, dark room. They were administered acepromazine (0.25 mg IM, or 2.5 mg PO, q8hr), buprenorphine (0.75 mg PO, q8hr) and medetomidine (0.1 mg IM, q24). Patients received decompressive cystocentesis and subcutaneous fluids as needed. This protocol resulted in success in 11 out of 15 patients with uroabdomen or hemoabdomen occurring in the remaining 4 cats. Clients must be informed of the rate of complications associated with this treatment modality.

During my investigations for this newsletter I was exposed to many different opinions and recommendations associated with catheterization techniques and urethral catheter composition. In summary, we should be as gently as possible, limited inciting inflammation of the urethra. We need to be careful with open ended catheters due to the possible mechanical implanation of crystalline material into the urethral mucosa. We should always use the softest (avoid polypropylene catheters), most inert indwelling urethral catheters as possible after the urethral obstruction is relieved. In an effort to minimize iatrogenic urethral trauma the use of 21g olive top needles (such as those used to flush lacrimal ducts) has been suggested as an alternative to open ended catheters to relieve obstructions.

Walpoles solution (JorVet) is a sterile buffered acetic acid (pH 4.5) solution which quickly dissolves struvite crystals on contact and is said, by the manufacturer, to not irritate or damage the brush border of the mucosal lining of the urethra. I am intrigued by the concept of the use of this solution as a flush to aid in catheterization or as a lavage for the bladder in cats with large numbers of struvite crystals. I remain apprehensive of its use due to the concern of inciting inflammation or exacerbating preexisting inflammation in the urethra and the bladder. These concerns appear to be valid based on others comments. I have been unable to find valid studies instituting the use of this solution. I would welcome feedback on any personal experience with the use of Walpole's solution.

References available upon request.
Images courtesy of Google Images

Our Doctors

Internal Medicine

Kelly Akol, DVM, DACVIM (SAIM)
Merrienne Burtch, DVM, DACVIM(SAIM)
Michelle Pressel, DVM, DACVIM (SAIM)
Bryn Hoffman, MVB (Residency Trained in Internal Medicine)

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Tom LaHue, DVM, DACVS
Dean Filipowicz, MS, DVM, DACVS

Oncology

Theresa Arteaga, DVM, DACVIM(Oncology)

Critical Care

Colleen Brady, DVM, DACVECC
Lillian Good, DVM, DACVECC

Cardiology

Kristine Yee, DVM, DACVIM(Cardiology)
Starting Dec 2014

Radiology (VRS)

Larry Kerr, DVM, DACVR
Mark Lee, DVM, DACVR

Emergency

Christian Robison, DVM
Kim Delkener, DVM
Mark Saphir, DVM
Jessica Kurek, DVM
Sara Heidelberger, DVM

Behavior

Jan Brennan, DVM (practice limited to behavior)

About Our Hospitals

Pacific Veterinary Specialists was founded to provide high quality, specialized medical care to companion animal patients. Our practice is dedicated to serving the veterinary community as a partner in total patient care. We offer comprehensive specialized services including video endoscopy, Doppler ultrasound, surgery, 24-hour ICU care, and emergency and critical care. Our staff is committed to providing compassionate and thorough medical care that meets the needs of the patient, client, and referring veterinarian. In September 2011 we opened PVSM and currently offer internal medicine and oncology, Tuesday through Thursday in Monterey. Behavior consultations by appointment are available on Mondays.

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