



VCA Hollywood Animal Hospital



Feline Urethral Obstruction: What you may not have read!

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Feline urethral obstruction (UO) is a relatively common and frequent emergency that all general practitioners and emergency veterinarians see on a daily basis. Feline interstitial cystitis (FIC) and feline lower urinary tract disease (FLUTD) are probably some of our most frustrating and heart-wrenching cases, however based on a recent study performed in the UK [i] it appears once we have learned how to manage these cases, we often do not reassess our practices based on more current recommendations or literature. For those of us who graduated from veterinary school in the previous century, or early 2000s there is a surprising amount of literature published in the past 10 years on this syndrome, some of which may ask us to reconsider some of our current management practices, our client communications, treatment plans and hospitalization expectations.

What we do know is that a UO should never die. A urinary obstruction, although life-threatening, is incredibly treatable, and if treated appropriately, comes with a greater than 90% survival rate [ii]. Unfortunately euthanasia is a real concern, and that is normally due to financial, and recurrence concerns. Most recent studies show a mortality rate between 3-8% and a recurrence rate in a 6-month period as high as 34% [iii], [iv].

Diagnosis and Initial Management:

The long-standing textbook description of a male cat straining in the litter box holds true. However, what we have also found, is that similar to other feline concerns, cats don't always read the textbook, and they can present with a multitude of clinical signs such as hiding, vomiting, recumbency, and just ADR. There has been quite a bit of discrepancy in different studies in regards to predisposing factors, however **indoor-outdoor cats seem to have a decreased likelihood of obstruction as well as older, heavier cats, and those fed a dry food diet may have an increased predisposition.** Breed and neuter or vaccination status have conflicting study results, as well as number of cats or litter boxes available in the house. Which leads us to the conclusion that **every cat, especially every male cat, needs an abdominal/bladder palpation on triage exam.** Although diagnosis can be unpredictable in nature, it is also one of the few diseases or syndromes that can be confidently diagnosed on physical examination by all veterinarians.

On initial triage exam we always get a set of vitals. This will include a TPR and a general assessment of the patient. Cats present in shock differently than people and dogs. They do not undergo the compensatory stage of shock with baroreceptor-mediated tachycardia and vasoconstriction. Cats manifest their **hypoperfusion as hypothermia, bradycardia and decreased vascular responsiveness to catecholamines and hypotension[v], meaning they may be dull, cold, and have a low heart rate. Although we do not always get baseline blood work, it has been shown that hypothermia was significantly associated with increasing azotemia and inversely proportional to potassium levels. Although hypothermia was not directly associated with length of hospitalization, patients with higher levels of azotemia, had longer hospitalization stays and higher serum potassium levels, [vi].**

It is imperative to remember that management of cardiovascular or perfusion abnormalities is paramount. This needs to be done, and stabilized prior to unblocking. Probably the best way to think about it is this: if you think you can unblock the patient without sedation because the patient is so dull, perfusion or cardiovascular status probably needs addressing prior to urinary catheter placement.

Initial treatment and monitoring consists of an IV catheter and fluid therapy, ECG placement and treating ECG abnormalities as necessary. A decent rule of thumb is not to touch the penis until "P" waves are present!

IV fluids continue to be the mainstay of initial management, followed by dextrose, regular insulin and calcium gluconate administration dictated by the ECG and/or potassium evaluation. Veterinarians continue to discuss and debate the benefits and concerns over fluid choice-- saline, LRS, Plasmalyte, NormR. Concerns have been that non-saline, balanced electrolyte replacement fluids contain a small amount of potassium (3-4 meq/L) and if given to a hyperkalemic patient, would that create more of a hyperkalemic crisis? The literature does not support this theory, and even supports using **balanced electrolyte solutions** as they tend to correct the severe acid-base abnormalities more quickly [vii]. **LRS/NormR/Plasmalyte are fluids of choice,** over 0.9% NaCl.

The rate and volume of fluids which we give these patients have also had some retrospective analysis performed in regards to causing fluid overload (FO) and possibly the cause for "pushing" and/or treating a post-obstructive diuresis. What was found was that FO is a

surprising, albeit real, complication associated with fluid therapy and urethral obstruction. Once noted and treated with discontinuing fluids, diuretics and thoracocentesis as necessary, FO patients may have suffered from an increase in morbidity, but not mortality. Monitoring frequently for a **development of a heart murmur, or gallop rhythm which has been associated with FO is indicated.** It is also interesting to note that patients that received a fluid bolus were more likely to develop fluid overload. That being said, the perfusion status of the patient, needs to take precedence when considering bolus fluid therapy. Despite the concern for fluid overload, it is still imperative to restore intravascular volume in patients that are exhibiting "shock."

Traditionally, a "shock dose" is determined by what the blood volume of a patient may be, or for cats, about 60 ml/kg. This is significantly less than a canine patient (90 ml/kg). We deliver "shock fluids" in 1/4-1/3 increments or 15-20 ml/kg over 15-20 min. To deliver a bolus for a 5-kg cat, 75 ml to be given in 15 min, a pump should have the VTBI as 75 ml, and the rate as 300 ml/hr. These are important management concerns to consider as cats have a reasonable chance for FO as previously mentioned.

Post-obstructive fluid diuresis (POD), or a urine output of greater than 2 ml/kg/hr has been noted in over 90% of cases within 8 hours of catheterization, with the greatest risk occurring 18-24 hours after catheterization. This value did not take into account fluid therapy as a variable, and a broader definition taking into account fluid rate was defined as a urine output higher than fluid input on at least two subsequent time points. Using this definition, only 36% of cases were noted to have a POD [viii], however it does reinforce the need to reassess fluid rates and urine output frequently. Cats have been known to produce more than 25 ml/kg/hr, therefore **urine output and its relative value to fluid rate, monitoring body weight, hydration status, and bladder size is imperative during hospitalization for the prevention of severe volume depletion.** Body weight gain or loss can be quite helpful in early recognition of FO or falling behind on fluids. Palpation of the bladder is an easy way to ensure catheter patency if or when the urine output decreases.

Cystocentesis in the initial stages of stabilization and even management is no longer considered taboo [ix] [x]. **Decompressive cystocentesis** may or may not require sedation and can be quite helpful in the stabilization of the patient. Cystocentesis will relieve the pressure within the urinary tract, and resume glomerular filtration and ideally stop the progression of renal injury. The decompressive nature of the procedure may also allow time for cardiovascular stabilization of the patient, as well as it may be easier to pass a urinary catheter once the back pressure has been relieved. In another study, cystocentesis every 8 hours was used as the primary means of urine evacuation in cases where the owner could not afford traditional catheterization. Although this methodology was mostly successful in routine cases, there is concern regarding the sicker patients and increased morbidity, and a true cost savings in private practice hospitalization may not be feasible.

Placement of an **indwelling urinary catheter** is still the primary means of urine evacuation. The urinary catheter should be hooked up to a closed urinary collection system, and as discussed before, the urine output needs to be frequently assessed. The frequency is often based on the severity of the patient. When emptying the urinary collection system, aseptic technique should be utilized. The urinary collection system apparatus should also be properly maintained.

Over the past several years, there have been developments in the type of urinary catheter placed as well as the size. Tomcat catheters made of polypropylene are useful for the initial unblocking, but are too rigid for indwelling use. Traditionally, most veterinarians use red rubber catheters which are made of polyvinyl as their indwelling urinary catheter, and these are still the author's preferred indwelling catheter. Polytetrafluoroethylene and polyurethane catheters are newer catheters that have the benefit for requiring only one catheterization as they can be used for the initial unblocking as well as indwelling use. The author has found that although the material is ideal, the logistics of the catheter placement and hospital management are more difficult than the less expensive red rubber catheter.

Recurrence of UO is a stressor for owners and veterinarians. Often cats are euthanized due to the scare alone of recurrence. Two JAVMA studies published in 2013 looked at possible causes and prevention of short-term recurrence rates. **Unfortunately, these two studies did not have the same consensus when evaluating catheterization time and size of the indwelling catheter.** Hetrick [xi] and Davidow [xii] found that smaller French 3.5 vs 5 French had a lower recurrence rate, where the Eisenberg study found that catheter size had no effect on recurrence rate [xiii]. Hetrick also noted that length of catheterization did not have a statistical effect the way Eisenberg did. The Eisenberg study found patients that had indwelling catheters for 26.5 hours, had less chance of recurrence than those catheterized for 24.5 hours. This may seem like a small difference in hours, however the point may be more importantly related to discussion and estimates with owners for how long **urinary catheters really do need to be in place as it appears 24 hours is still most likely standard of care.**

Anti-inflammatories and anti-spasmodics have also been evaluated. Although it seems intuitive **anti-inflammatory administration has not been associated with decreased recurrence or pain** [xiv] [xv], whereas the use of prazosin may have some evidence to help with decreasing chances of re-obstruction. The use of phenoxybenzamine did not show any reduction in recurrence [xvi]. Although prazosin was shown to help in one study there is still some question about its efficacy. Prazosin is only effective on smooth muscle, which is only the most proximal ¼ to 1/3 portion of the feline urethra with the remainder of the urethra being skeletal muscle in which prazosin has no effect.

Cats are inherently finicky. If we don't have their environment just right, we may cause stress on them and then the theory is that they have an increase in FIC or FLUTD. **The recent studies suggest the only change in a cat's environment that actually affected the rate of recurrence is increasing water intake. Type of litter, number of litter boxes, etc. did not have an affect on recurrence.**

It is now widely accepted that unless absolutely necessary, **antibiotics should not be used while a urinary catheter is in place.** In regards to urinary obstructions, most of us learned that a UTI is a very rare cause, however more recent evidence may be higher than originally thought [xvii]. Of greater concern though is the introduction of bacteria into the bladder while the urinary catheter is in place [xviii]. **This warrants a urine culture being performed after the urinary catheter has been removed, rather than at the time of presentation. Ideally, a culture obtained by cystocentesis would be performed 3 days after removal to determine if a UTI has been introduced and antibiotics prescribed based on these results.**

Clinical practice will continue to have divergent opinions of management, and in lieu of strong clinical evidence-based guidelines, anecdotal and habitual management strategies will most likely continue. Hopefully the current literature will continue to pave the way for future evaluation, and re-evaluation of our current practices as occurrence and recurrence of urethral obstruction are mainstays of our small animal clinical practice.

[i] (Humm, 2016), [ii] (Segev G, 2011), [iii] (Gerber B, 2008),[iv] (Segev G, 2011), [v] (Brady CA, 2000),[vi] (Fults Mitchell, 2012), [vii] (Drobatz KJ, 2008),[viii] (Fröhlich L, 2016),[ix] (Hall Jennifer, 2015),[x] (Cooper ES, 2010),[xi] (Hetrick P, 2013),[xii] (Davidow, 2013),[xiii] (Eisenberg BW & Horton, 2013),[xiv] (Hetrick P, 2013),[xv] (Dorsch R, 2016),[xvi] (Hetrick P, 2013),[xvii] (Segev G, 2011), [xviii] (Hugonnard M, 2013).

