Feline Urethral Obstruction (UO) is one of the most common emergency conditions seen by veterinarians in practice. Most of the time, treatment is straightforward and cats do well following unblocking with an estimated 90% survival to discharge in the study by Lee, et al. However, if you have been unblocking cats with urethral obstruction with frequency, with time you will find that complications may arise and this can be frustrating, particularly when you have not prepared the owner for these possibilities. When preparing an owner for the unblocking procedure, I always mention the possibilities of a difficult unblocking, the potential for urethral tears, and the risk for reblocking in the short term as the most common serious complications that I’ve noticed over the years.

MY IDEAL APPROACH TO MANAGEMENT OF BLOCKED CATS

When finances are not limited and the client is ‘all-in’, I prefer to approach the cat with a urethral obstruction in the following way:

- Full lab work prior to sedation, with particular attention to acid-base status, renal values, and electrolyte concentrations.
- Optimally, a lateral abdominal and perineal radiograph should be performed prior to unblocking to assess for uroliths. My suggestion for performing this prior to unblocking is several fold:
  - Sometimes air bubbles are introduced into the bladder at unblocking and this, combined with the presence of a urinary catheter, may make identification of urolithiasis more challenging.
  - If uroliths are present, the client should be prepared for cystotomy once patient has been unblocked and azotemia/hyperkalemia is resolved. This obviously adds cost to patient care, so making the owner aware of the presence of stones prior to spending money unblocking is useful. While dietary dissolution of stones could be attempted, there is no guarantee stones will dissolve, as is the case with calcium oxalate stones and there is high risk for reblockage in the interim.
  - In some sick blocked cats, there will be effusion around the neck of the bladder prior to unblocking. This may be due urinary bladder rupture or, more commonly, due to transmural leakage of urine secondary to increased permeability of the bladder wall due to high intravesicular pressure and bladder wall pathology. Knowing this prior to attempting unblocking provides peace of mind that you did not cause the issue when noted post unblocking.
- Heavy sedation of the patient for unblocking – depending upon severity of illness and time spent in the procedure, I may intubate the patient and maintain on isoflurane to ensure adequate oxygenation/ventilation with a good level of anesthesia. My preference for sedation is usually butorphanol (0.2-0.3 mg/kg) with a benzodiazepine (0.25-0.5 mg/kg) IV, followed by either IV propofol to effect (1-4 mg/kg during the procedure) or IV alfaxalone to effect (1-3 mg/kg). If the procedure is quick and patient is stable I don’t tend to intubate. However, if the patient is sick, obese or the procedure prolonged, I prefer intubation to limit excessive titration of additional propofol/alfaxalone without a protected airway.
- Unblock with open-ended 3.5–5 French polypropylene or polyurethane urinary catheter connected to T-set and 10cc syringe containing sterile saline for hydropulsion.
- A urinalysis should be performed at unblocking to assess for crystals, urine pH and the presence of bacteria at the time of unblocking (which is exceptionally rare in young male cats).
- Maintain patient with an indwelling urinary catheter connected to a closed collection system for 24-48 hours, or until the urine is clear and azotemia resolved. The indwelling catheter should be a polyurethane or red-rubber catheter and not polypropylene, as they are too irritating for longer-term use. Historically I would use the largest urinary catheter that fit without tissue drag. However, a study by Hetrick, et al showed that reblocking was statistically more common when a 5 french urinary catheter was used over a 3.5 french urinary catheter (interestingly the study by Eisbenberg et al showed no influence of catheter size of rate of reblocking).
- The patient is started on prazosin (current recommendation 0.5 mg per cat twice daily, based upon a paper by Reineke, et al that suggested there was no difference in rate of recurrent blockage when prazosin was compared to placebo when 0.25 mg/cat was used every 12 hours), pain medication (IV or oral transmucosal buprenorphine 0.015 mg/kg q6-8 hour) +/- gabapentin for anxiety in hospital.
- Daily urine sediment exam, institute antibiotics pending urine culture if bacteriuria is documented at the time of catheter pull or any point in hospitalization. Preemptive use of antibiotic therapy in the absence of bacteriuria.

**WHAT TO DO WHEN THE IDEAL APPROACH IS NOT POSSIBLE**

- Exclude any diagnostics and simply treat according to outline above.
- **Outpatient unblock and go** – In a study by Seitz, et al, outpatient unblocking was associated with a 31% recurrence rate compared to 11% for those treated with indwelling urinary catheters. While this rate is much higher than the standard of care, it is important to note that a large percentage of cats will do well with this option and it should be considered for appropriate candidates in lieu of humane euthanasia.
- **Decompressive cystocentesis and medical therapy without unblocking:** This approach to feline urethral obstruction has been described by Cooper, et al to be used when the owner cannot afford an unblocking procedure. While certainly not the standard of care, this can be considered in lieu of humane euthanasia. With this protocol, the patient is sedated with acepromazine and buprenorphine, the penis is massaged in attempt to dislodge a plug and 1 attempt a to express the bladder is made thereafter. If not successful the bladder is emptied via cystocentesis, the patient house in a dark/quiet environment. This is repeated every 8 hours for 72 hours and SQ fluids are given if needed. In this study of 15 cats, this was successful in 73% of cats, however it is important to note that critically ill cats with urethral obstruction (defined by altered mentation, severe acidosis or hyperkalemia) and patients with documents stones were excluded from this study.

**COMMON COMPLICATIONS SEEN IN CATS WITH URETHRAL OBSTRUCTION:**

**Cardiovascular instability secondary to severe hyperkalemia:** Hyperkalemia, often with concurrent azotemia, metabolic acidosis and ionized hypocalcemia, may be present in cats with prolonged urethral obstruction. This may cause moderate to severe bradycardia, as a result of
the effect that high potassium and low ionized calcium has on cardiac conduction. In the absence of in-house laboratory testing, the combination of hypothermia (< 96.6°F) with bradycardia (< 120 bpm) was 98% specific for severe hyperkalemia (> 8 mEq/L) in the 2006 study by Lee, et al.

Electrocardiographic evaluation of heart rhythm should be performed in all cats with documented hyperkalemia. It is the author’s experience that magnitude of hyperkalemia does not always correspond to severity of ECG changes. Treatment of hyperkalemia may entail simply IV fluid therapy and unblocking to increase GFR if mild and there are no cardiovascular consequences. When ECG changes are noted (spike T wave → prolonged PR interval → loss of p waves → prolonged/sine wave QRS) hyperkalemia should be managed with either calcium gluconate as a cardioprotectant during unblocking +/- insulin/dextrose therapy when severe. I tend to give 3 cc of 10% calcium to effect per cat while viewing ECG if changes are present. I’ll either give 0.5 g/kg dextrose bolus or combine this with 1 unit regular insulin IV if hyperkalemia is causing significant ECG/cardiovascular changes – when insulin is given you must put 2.5% dextrose in IV fluid bag as well as a dextrose bolus to avoid hypoglycemia.

**Inability to unblock:**
While most cats are easy or provide a mild-moderate challenge to unblock, there is the occasional patient that seems or is impossible. It happens to everyone. I typically unblock cats on their backs with their hindlimbs pulled forward. When this is working for me, I change positioning to lateral recumbency with legs pulled forward or even sternal recumbency with legs handing off the table. I’ll ‘phone a friend’ and tap out – see if they are more successful. I’ll even try a different catheter – I’ve reverted to 18-22 gauge over the needle IV catheters in some cases and have had some success with metal olive tipped catheters. Despite years of experience and feeling like I know every trick in the book, there are still some cats I cannot unblock due to urethral pathology or urethral tears.

**Decompressive cystocentesis** should be considered when unblocking is difficult or if the bladder is large prior to unblocking. The rationale behind decompressive cystocentesis is that it will relieve intravesicular pressure within the bladder, which will improve GFR more rapidly (this is helpful in azotemic, hyperkalemic patients) and will assist with hydropulsion of stones/plugs back into the bladder. While I do not routinely perform decompressive cystocentesis in all blocked cats, there are some clinicians who perform this routinely in all blocked cats prior to attempting unblocking. The risk of decompressive cystocentesis in a UO cat is that inserting a needle into an already unhealthy and pressurized bladder may result in tearing of the bladder wall or leakage of urine through the insertion site. However, a study by Hall, et al in 47 cats who had decompressive cystocentesis performed prior to unblocking showed that there was no increased risk for bladder rupture/leakage.

If the aforementioned techniques are not successful, percutaneously transabdominally placing a locking-loop “pigtail” catheter into the urinary bladder will allow continuous drainage of urine from the bladder to facilitate patient stabilization by improving GFR such that metabolic derangements resolve. Once the patient is more stable, positive contrast urethrogram +/- perineal urethrostomy surgery can be performed. Placement of a pigtail catheter will be detailed in the lecture.
**Urethral tear:** Overall, urethral tears are uncommon in cats with lower urinary tract disease. With urethral tears, urine leaks into the SQ tissue, resulting in marked tissue inflammation exhibited by red, painful and swollen perineal/preputial and medial thigh region in cats. This may be present, even when the patient is urinating normally. These cats are often quite painful, lethargic, inappetant and usually develop fevers and progressive azotemia.

Urethral tears are confirmed via positive contrast urethrography, using a urinary catheter situated at the distal tip of the urethral and injecting iodinated contrast material into the bladder. Dosage of 5 ml/cat is usually sufficient to document urethral tearing.

When a urethral tear is documented, these cats can often be successfully managed with a conservative approach of catheterization across the tear to prevent additional urine leakage while allowing the tear to heal on its own. Usually catheters can be place in the normal retrograde manner, but when not possible to catheterize across the tear, either antegrade catheterization by feeding a guidewire out via the bladder or urinary diversion via percutaneous pigtail catheter placement into the bladder is needed. Typically it take 5-10 days for the urethral tear to scar down and heal and confirmation of healing is confirmed via repeated contrast urethrography. The biggest concern following treatment of urethral tears is stricture formation at site of the tear.

**Post-obstructive diuresis:** Post-obstructive diuresis has been reported in 50% of cats with UO, defined as a urine output > 2ml/kg/hr. In my experience early UO cats are less likely to do this, but those that are sick with azotemia tend to be more likely. In these cats, if UOP is not quantified and fluid rates increased to match urine output, it is difficult to maintain adequate hydration and resolve azotemia. It is recommended that fluid rate match urine output per hour plus 20 ml/kg/day to account for insensible losses. I have had cats on in excess of 40-60 ml/hr in some instances. Once azotemia resolves and urine is dilute fluid rate can be tapered (ie reduce fluids by 25% every 6 hours), as at this point you are pushing the diuresis.

**Recurrent obstruction:** The incidence of recurrent urethral obstruction has been documented to be around 30% on average, ranging from 11-43% (Gerber, et al vs. Hetrick, et al) depending upon the study that is cited. Owners should be warned of this risk at time of unblocking and mentally prepared that it may not be successful despite standard of care therapy. A 2013 study by Hetrick et al, with a 23% rate of reobstruction, showed that 86% of recurrence occurs within the first 4 days of urinary catheter removal. In this study, use of phenoxybenzamine (rather than prazosin – 21% vs. 7%) and a 5 french urinary catheter (rather than 3.5 french – 18% vs. 6%) were associated with higher rates of recurrent obstruction. However, a 2nd 2103 study by Eisenberg, et al found no difference in rate of recurrent obstruction between 3.5 french and 5 french urinary catheters. Outpatient unblocking had a 30% rate of recurrence, compared to 11% in those maintained with an indwelling urinary catheter for 24 hours or more (Seitz, et al). For these reasons analgesia and antispasmodic medication should be continued for at least 5-7 days following urinary catheter removal.

**Urinary tract infection:** Urinary tract infection (UTI) is uncommon in cats with their first UO at time of unblocking. However approximately 30% of cats develop a UTI during the course of catheterization. Preemptive use of antibiotics without documented urinary tract infection is not advised, particularly when a urinary catheter in place to reduce risk for a resistant UTI. Daily urine sediments should be performed for evidence of bacteriuria – when found a culture is
advised and antibiotic therapy started, preferably once catheter is pulled. In some instances, the development of a UTI during catheterization will result in urine that is not clearing up as expected, azotemia may be prolonged or the patient spikes a fever – in this scenario antibiotic therapy should be start before catheter removal.

References: