
Feline Urethral Obstruction

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Feline urethral obstruction is a common emergency condition. It has variable severity in its presentation, course of disease and prognosis. There are numerous underlying causes including urolithiasis, crystalline urethral plugs, and obstructive idiopathic disease. The nomenclature has changed in an effort to best describe the idiopathic form. We hesitate to use histologic terms like interstitial cystitis because there may be multiple etiologies for cystitis that result in the clinical syndrome that we are all familiar with. Feline Lower Urinary Tract Disease, Feline Urologic Syndrome, and Feline Idiopathic Cystitis are all terms people use to describe the constellations of signs we see in cats when urinary tract infection, uroliths or other defined causes have been ruled out. The pathogenesis of the idiopathic form is not well understood and involves many proposed risk factors including diet, environment, neutered status, body weight and even seasonality. We have come to recognize that indoor, male neutered, overweight cats on dry food are at higher risk for developing urethral obstruction. There has not been much new research in the last 10 years evaluating risk factors. But Jukes 2018 published a study aiming to better characterize the body condition aspect as a risk factor for urethral obstruction. It was a retrospective study examining 195 cats who presented for urethral obstruction compared to 195 control cats seen during the same time period. Their findings showed that while the incidence of urethral obstruction was not associated with increasing body weight, it was associated with increasing body condition score. The risk for developing urethral obstruction doubled for each body condition score above 4 (BCS out of 9).

Catheter size and duration of dwell time of catheter

Hetrick 2013 presented data that suggested there was an advantage in cats that had a 3.5 french urinary catheter placed. These cats had less recurrence of urethral obstruction at

24 hours (3.5 Fr 7/105, 6.67% v. 5 Fr 11/58, 18.97%; $p=0.017$) and 30 days (3.5 Fr 14/82, 17.07% v. 5 Fr 16/51, 31.37%; $p=0.055$) post catheter removal compared to a 5 Fr catheter. A reasonable explanation for this finding could be that the larger size of the catheter is more irritating thereby prolonging urethral inflammation.

The dwell time of the urinary catheter is somewhat arbitrary and varies greatly by clinician and by case. For the run-of-the-mill urethral obstruction with very little grit or blood in the urine that was easy to unblock, we usually keep the urinary catheter in for 24 hours, sometimes less. Through the literature the dwell time varies greatly as well, from as little as 12 hours to as long as 60 hours. Only one author specifically looked at catheter dwell time and impact on recurrence rates in a prospective manner. Eisenberg 2013 evaluated 68 cats from admit through follow up at 30 days post discharge. Ten out of the 68 cats reblocked within 30 days of discharge. The mean catheterization time for the cats that reblocked within 30 days was 21 hrs and 32 hrs for those that did not reblock within that time frame.

Management Post Discharge

Nivy 2019 evaluated 51 cats in a prospective randomized manner two treatment protocols post discharge. All cats were unblocked and treated per clinician preference. No cat received ketamine nor an alpha 2 agonist. All cats were given phenoxybenzamine during hospitalization. Nearly all the cats had a 5 Fr urinary catheter placed. Median duration of urinary catheter indwell time was 2 days. Median duration of hospitalization was 3 days. Cats were discharged with phenoxybenzamine 2mg/cat q 12 hr, and alprazolam 0.125 mg/cat q12h for 2 weeks. Twenty four were additionally given 0.025 mg/kg/day PO meloxicam and the remaining 27 cats were not. The addition of meloxicam did not influence recurrence rate. Overall recurrence rate of obstruction at 10 days was 1(2%), at 1 month 2 (4%), and 8 (16%) by 6 months.

Hetrick 2013 published a retrospective study involving 192 cats with urethral obstruction secondary to idiopathic disease. They examined the relationship between different management strategies and risk of recurrence of urethral obstruction. There was significantly higher recurrence rate of urethral obstruction in cats given phenoxybenzamine at both the 24 hours (phenoxybenzamine 10/46, 21.74% v. prazosin 10/140, 7.14% $p=0.006$) and 30 days (phenoxybenzamine 16/41, 39% v. prazosin 20/110, 18.18% $p=0.008$) after pulling the urinary catheter. Phenoxybenzamine is non-selective alpha 2 adrenergic antagonist which takes several days to reach maximum efficacy. Whereas prazosin has greater alpha-2 adrenergic affinity and a shorter onset of action which could explain improved outcomes post discharge.

Dorsch 2016 set out to evaluate the effect of meloxicam on the recurrence rate of cats with urethral obstruction. Thirty seven cats with urethral obstruction were treated with an indwelling urinary catheter and buprenorphine for 2 days. Cats were randomly assigned to additionally receive meloxicam or placebo after the first 24 hours of hospitalization for 5 consecutive days. Meloxicam was administered at 0.1 mg/kg for the first dose then 0.05 mg/kg q 24 hours for 4 days. Cats were only followed one week out from initial presentation. The recurrence rate of urethral obstruction within that 4 day period after discharge was similar between groups, 4/18 cats (22%) in the meloxicam group and 5/19 cats (26%) in the placebo group. At home evaluation of pain behavior, voiding behavior, food intake and general demeanor was reported to be similar between groups. It is commonly thought that robenacoxib is better tolerated than either meloxicam or carprofen and is FDA approved for post-surgical pain in cats for up to 3 days. One larger study in 2016 in 194 cats showed that daily robenacoxib dose ranging 1-2.4 mg/kg per day for 28 days was well tolerated even in cats with CKD.

Reineke 2018 attempted a prospective double blinded study in which 27 cats were administered 0.25 mg q 12hr prazosin and 20 cats were administered placebo for 30 days following urinary catheterization for urethral obstruction. There was no significant difference in the recurrence rate for obstruction post discharge between groups at 1 month

(prazosin 7%, placebo 5%) or 6 months (prazosin 15%, placebo 17%). Interestingly there was a difference noted in the median catheterization time (prazosin 32 hr v. placebo 39 hr, $p=0.02$) and hospitalization time (prazosin 37 hr v. placebo 46 hr, $p=0.036$) between groups. This could have been purely coincidence because there are numerous factors involved with deciding when to remove a urinary catheter from patient compliance to mechanical problems with the catheter to time of day. Also the difference in their results compared to a previous study could be the dose of prazosin used which was half the dose used in the Hetrick study. Nonetheless, the theoretical benefit of prazosin and the relatively low adverse effects makes it a reasonable choice to use as long as the administration of the medication at home does not add to stress on the cat.

Medical management, conservative management of UO

Sometimes hospitalizing a cat with an indwelling urinary catheter is outside of an owner's financial means. In these cases a veterinarian might do a "drive by unblocking" and hope for the best, giving the owners a strong warning that there is high likelihood their cat will reblock. Two papers examine this scenario using different treatments, one using medical management only without catheterization, and the other comparing one-time passing of urinary catheter to an indwelling urinary catheter.

Cooper in 2010 evaluated the use a medical management protocol without urethral catheterization in a group of cats. Fifteen male cats in which conventional treatment for urethral obstruction was declined by the owners were enrolled in the study. All cats were deemed to be metabolically stable and did not have radiopaque calculi. Cats were given acepromazine, buprenorphine, and medetomidine up to three times daily to keep cats comfortable and relaxed. Decompressive cystocentesis was performed up to 3 times per day and subcutaneous fluids were administered 1-2 times daily as needed. Success was determined if voluntary voiding was noted within 72 hours of implementing treatment. This medical management strategy was successful in 11 of 15 cats. The cats who failed therapy developed uroabdomen (3) or hemoabdomen (1). Cats in the treatment failure

group had significantly higher creatinine compared to cats in the successful group (10.10 mg/dL compared to 4.4 mg/dL, $p < 0.05$). On 3 week follow up call to the clients, 2 of the 11 remaining cats had an additional occurrence of urethral obstruction.

Seitz 2018 compared the outcome in 107 cats, half of whom were treated with a one-time unblocking and passage of a urinary catheter (outpatient group) and half who were treated with standard of care with an indwelling urinary catheter (in patient group). Cats with prior obstructions, urinary calculi, urethral tear among other reasons were not included in this study. There were no differences in biochemical abnormalities, physical exam findings or difficulty in unblocking between groups. Sedation and treatment with buprenorphine and prazosin (among other medications) were similar between groups. Recurrence rate of urethral obstruction within 30 days was higher in the outpatient group compared to the inpatient group (14/45, 31% vs. 5/46, 11%; $p = 0.018$). This roughly translates into a 3 times higher risk of recurrence of urethral obstruction after a one time urinary catheterization and treatment as an outpatient. Out of all of the cats that reblocked, 18/19 reobstructed within 1 week of removal of the urinary catheter.

Decompressive cystocentesis has some proposed benefits including providing patient relief, expediting resolution of metabolic disturbances prior to definitive unblocking and reducing intraluminal pressure facilitating placement of the urinary catheter. The biggest risk, of course, is bladder rupture and resultant uroperitoneum. Hall 2015 retrospectively examined the risk of bladder rupture in 47 cats that had decompressive cystocentesis prior to unblocking. They used a 22 ga 1.5 inch needle with an extension set to remove the urine. Mean dwell time for the catheter was 28 hours and hospitalization time was 40 hours. None of the cats were assessed as having developed uroperitoneum. Loss of detail cranial to the bladder was noted on over 50% of radiographs taken, however no fluid was obtained from the abdomen in any cat. It should be noted that loss of detail cranial to the bladder can be seen even without prior cystocentesis and likely represents local inflammation secondary to the obstructed urinary bladder. In cases where the clinician

identifies decreased detail cranial to the bladder, the presence of fluid should be confirmed via ultrasound and obtained for evaluation if possible.

Antibiotic use in UO

It is generally agreed that primary urinary tract infection is an uncommon cause for feline urethral obstruction. But there is some debate about antibiotic use in these cats because of the possibility of UTI associated with urinary catheter placement. Previous studies looking at this are over 10 years old and showed varying results and methodology was different between studies. Cooper 2017 reported findings from a prospective observational study in 31 cats with urethral obstruction. The study obtained urine cultures on presentation as well as q 24 hours until urinary catheter removal. No cat had a positive urine culture on presentation. Four of 31 cats (13%) had positive urine cultures from urine samples obtained 24 hours after urinary catheter placement. *Streptococcus* spp and *Pasteurella* spp were identified. The authors could not strongly recommend empirical antibiotic based on these findings.

Fluid therapy

Clinicians are lucky to have numerous fluid types at their disposal nowadays. It is most common to generally choose a buffered isotonic balanced crystalloid (LRS, Plasmalyte, Normosol R) for volume replacement. However there are a few specific indications for 0.9% NaCl which is not buffered and does not have any supplemental electrolytes other than sodium and chloride. Severely affected urethral obstruction patients can have life threatening hyperkalemia. Some clinicians might prefer 0.9% NaCl over another crystalloid because it is completely potassium free. A few studies in the recent past have shown that the reduction in potassium is not hindered by the use of potassium containing fluid and there is a slightly longer time to resolution of acid base status with the use of 0.9% NaCl, an inherently acidic fluid.

The fluid rate in cats with urethral obstruction is also debatable. There are reasonable guidelines for the initial phase if the cat is hypovolemic and in shock. However once the urinary catheter is placed and they are deemed more stable, fluid rates vary widely depending on institution and clinician preference. Two times “maintenance” fluid rate is a reasonable starting fluid rate which can be adjusted based on the presence of post obstructive diuresis or patient risk factors such as heart disease. The important thing is to constantly monitor urine output and calculate ins and outs over several hours to determine if fluid rates need to be adjusted. Be aware that urine output is influenced by fluid administration. Thus making the determination as to when post obstructive diuresis has resolved can be tricky.

Perineal urethrostomy

Indications for a perineal urethrostomy include urethral tear past which a urinary catheter cannot be placed, and chronic recurrent urethral obstruction refractory to appropriate duration of medical management. Decades ago PU surgeries were thought of as a first line treatment for urethral obstruction but now are considered a salvage procedure when other treatments have failed. It is important to fully work up these cases prior to surgery to ensure no other significant co-morbidities will hinder recovery. Urine culture, abdominal ultrasound (or at least focal bladder ultrasound) and contrast urethrogram are ideal diagnostics prior to performing a PU surgery.

Savvy owners who do an internet search may express interest in having a PU surgery done for their cat with a first time urethral obstruction. It is very important that the client understand what a PU is not; A first line treatment for urethral obstruction, not even a second line treatment for urethral obstruction, a quick fix, or the answer to all the cat’s problems. We must be mindful that not all anatomical locations along the urethra are amenable to PU and the surgery does nothing to address underlying cystitis if present. Perineal urethrostomy is a major surgery. The complication rate is variable but reported to be as high as 25%. Short term complications include UTI and hemorrhage, and long term

complications include urinary and fecal incontinence and urethral stricture. Surgeon experience does play a role in the complication rate thus referral to a center with surgeons experienced with this procedure may help ensure a better outcome.

Feline urethral obstruction is a great example of treatment evolving through good research. How we approach this condition is very different than 20 years ago. Unlike other disease conditions there's no single accepted approach to management. There are "reasonable recommendations" based on the literature; 3.5 Fr urinary catheter instead of 5 Fr, leaving urinary catheter in for at least 24 hours, using Prazosin over phenoxybenzamine, starting antibiotics only if culture positive (or maybe not?). Client education continues to be important regarding at home management and recurrence rates. Perineal urethrostomy should be a last resort treatment option for the management of this condition.

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