FELINE URETHRAL OBSTRUCTION: THE BLOCKED CAT

Garret Pachtinger, VMD, DACVECC
Megan L. Brashear, CVT, VTS (ECC)

Urethral obstruction is a common, yet challenging case for veterinarians and a potentially life-threatening manifestation of feline lower urinary tract disease.

History and Clinical Signs

Cats with lower-urinary-tract disease have common historical findings which may include stranguria, pollakiuria, licking of the genital area, hematuria, passage of only small amounts of urine, vocalizing (when urinating or posturing), inappropriate urination, as well as anorexia, lethargy, and vomiting. It is important that the clinician recognize that owner perception of posturing may be difficult as many owners misinterpret posturing for straining to defecate or constipation.

Most cats with lower-urinary-tract signs are between 2 and 6 years of age. True feline urethral obstruction occurs primarily in male cats and are commonly young to middle aged. Cats presenting to the veterinarian for the first time with lower-urinary-tract signs that are older than 8 years of age should be evaluated for the presence of urinary-tract infection, bladder/urethral stones and neoplasia, not just assumed to have idiopathic sterile cystitis.

Examination

On any feline patient, especially male, where there is a concern for the signs noted above, the bladder should be palpated immediately. A small, soft bladder that is difficult to palpate in an otherwise healthy cat makes urethral obstruction unlikely. While the size of the bladder may vary, even potentially being small, cats with urethral obstruction typically have a firm and painful bladder, regardless of the size when obstructed. The clinician can also evaluate the tip of the penis if concerned about the patient. In cases of feline urethral obstruction, the penis is typically red or purple in color and a urethral plug or grit may be seen at the urethral opening.

Following palpation of the bladder, a complete physical exam should be performed. In cats with urethral obstruction, the heart rate and rhythm as well as evaluation for the presence of a heart murmur should be evaluated. Bradycardia (a heart rate < 140 bpm) should alert the clinician to the likely presence of hyperkalemia. A heart murmur or arrhythmia may also change your sedation protocol as well as long term treatment plan including fluid therapy. Using other simple tools, hypothermia is common in sick patients and the combination of bradycardia and hypothermia (T < 96.6°F) has been found to be 98% predictive of serum potassium level greater than 8 mEq/L in cats with urethral obstruction.

Stabilization of the Blocked Cat

Following history, examination, and diagnosis of urethral obstruction (based on clinical signs and physical examination findings), a stabilization protocol should be immediately performed.

A peripheral intravenous catheter is immediately placed, blood work performed, and fluid therapy started. The bloodwork, at minimum, should include an extended database (PCV/TP/GLU/AZO/Electrolytes +/- Blood gas). Common findings of the affected blocked cat may include metabolic acidosis, hyperkalemia, and azotemia.

Another diagnostic to consider in the emergency setting is the use of an electrocardiogram. Cardiac arrhythmias and bradycardia should be swiftly documented, and treatment started if present.

Treatment of Hyperkalemia

The author typically uses the therapies below in this order:

1) Intravenous fluid therapy
    a. Isotonic crystalloids are used to improve perfusion, hydration, and dilute the potassium. Even isotonic crystalloids containing small amounts of potassium (e.g. Normosol R or Plasmalyte) are acceptable as the small amount of potassium is unlikely to cause a worsening of the hyperkalemia. Moreover, the fluid therapy will improve perfusion and hydration, with the goal of resolving the described metabolic acidosis.
    b. Calcium gluconate is a potentially live saving therapy for hyperkalemic patients. Calcium glucontate increases the cell's threshold membrane potential reestablishing the normal difference

between resting membrane potential and threshold potential. This will allow the cardiac cells to depolarize.
    i. Dose: 3 ml/cat administered intravenously over 3–5 minutes while evaluating the ECG.

c. Dextrose and regular insulin are also considered with the goal of stimulating the Na+/K+ ATPase causing intracellular movement of potassium. Dextrose alone is not used, rather in combination with the insulin to prevent hypoglycemia.
    i. Dose: 1 unit of regular insulin/cat intravenously immediately followed by 0.5 g/kg of 50% dextrose diluted 1:4.
    ii. The patient will require supplementation of 2.5-5% dextrose in fluids for several hours to prevent hypoglycemia.

d. Sodium bicarbonate: The author rarely uses this therapy as the acidosis in question is commonly resolve with fluid therapy alone. Intravenous sodium bicarbonate will increase the pH in the extracellular space, stimulating the exchange of intracellular H+ ions for extracellular potassium pushing potassium into the cell.
    i. Dose: 1 mEq/kg once or 0.3(BWkg) – BE (usually 1/3–1/2 of this dose will be given).

URETHRAL CATHETERIZATION

Once the patient has been stabilized, the next step is relief of the obstruction with placement of a urinary catheter. This will reestablish normal urine flow and subsequent resolution of hyperkalemia and azotemia.

The author typically uses a combination of sedatives including butorphanol, a benzodiazepine (i.e. midazolam or diazepam), ketamine, and/or propofol to provide heavy sedation. In rare cases, the author will use general anesthesia. The goal of heavy sedation and/or anesthesia is to allow for maximal urethral relaxation and decreased pain associated with placement of the urethral catheter.

Example protocol in a stable patient without cardiac disease

- Butorphanol 0.4 mg/kg IV
- Diazepam 0.3mg/kg IV
- Ketamine 5 mg/kg IV.

It is important to recognize this is one protocol, and the individual patient will need careful assessment to determine if this combination and/or dosing is appropriate for that patient.

Along with sedatives and anesthesia, the use of a coccygeal epidural has been recently described to reduce urethral spasm and improve comfort during and following the placement of the urinary catheter.

Once sedated or placed under anesthesia, an open-ended polypropylene (3.5Fr) tomcat catheter is first used to relieve the obstruction. Sterile procedure is essential to reduce the risk of iatrogenic infection including sterile gloves, sterile preparation of the perineum, and draping the perineum. Syringes of sterile flush (e.g. 0.9% NaCl) are used to flush the tomcat catheter and retropulse the obstruction.

If a plug or debris is seen around the perineum or the tip of the penis, careful digital manipulation and rolling the penis between the fingers can assist in breakup of the plug and catheter placement.

Once the obstruction is flushed and the tomcat catheter is seated in the urethra, the bladder is emptied and flushed. As the tomcat catheter is rigid, this is not used as an indwelling catheter. This should be removed and replaced with a softer, indwelling urinary catheter such as a red rubber catheter. This red rubber, indwelling catheter is sutured in place and connected to a closed collection system.

Diagnostic evaluation

Following catheter placement and further patient stabilization, additional diagnostics to consider include complete bloodwork (CBC and biochemistry profile), urinalysis, and abdominal radiographs. Additional diagnostics such as urine culture and abdominal ultrasound can be considered based on the initial diagnostics results.

Hospitalization and Follow-up

Most of our feline urethral obstruction cases remain in hospital for approximately 36-48 hours. Criteria for removal of the urinary catheter include:

- The urine has an improved color and character (i.e. not bloody, gritty, or cloudy)
- Normal fluid balance (i.e. not excessive urinary outputs)
- Correction of electrolyte imbalances
- Correction of azotemia

Thorough discussion should be performed with the owner regarding any underlying causes found and notably monitoring in the future due to the concern for re-obstruction. The most common time for re-obstruction is within the first few days following hospital discharge.

The author typically discharges the patient with buprenorphine and either prazosin or phenoxybenzamine along with counsel for diet change if indicated.

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