



veterinary medicines and veterinary vaccines

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The Blocked Cat

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Etiology and Pathogenesis

The phrase 'blocked cat' refers to cats with urethral obstruction and is one of the most common emergencies encountered in small animal practice. Obstruction is far more common in male than female cats due to the length and shape of the penile urethra. Cats that are overweight, live indoors or are fed a dry diet are predisposed. The blockage is caused by the combined effects of inflammation (increased proteins and mucus) and urinary crystals (struvite or oxalate) that result in the formation of a urethral plug. In most cases, urethral obstruction is associated with feline idiopathic cystitis (FIC) but in some, primary urolithiasis may be more significant. Other causes include urethral spasm or strictures.

History and Clinical Signs

Urethral obstruction should be considered as a differential diagnosis in any unwell, male cat. The presenting signs depend on the duration of the obstruction. Early signs may not be apparent to the owner, particularly in cats that urinate outdoors. Initially, cats show frequent attempts at non-productive urination, often associated with pain and vocalization. They often appear restless and lick their genitalia excessively. If the obstruction is not relieved within 36–48 hours, clinical signs of post-renal azotemia and hyperkalemia develop, including depression, anorexia, vomiting and dehydration, progressing to collapse, hypothermia and death. Hyperkalemia can cause bradycardia or ventricular dysrhythmias.

Important Differential Diagnoses

Non-obstructive lower urinary tract disease

- FIC
- Uroliths/cystoliths
- Neoplasia
- Trauma
- Bacterial infection
- Anatomical abnormalities
- Behavioral problems

Any condition causing severe malaise in the (male) cat.

Specific diagnostic techniques

Suspected cases should undergo triage assessment, i.e., rapid assessment of respiratory and cardiovascular status, and bladder palpation. Critically ill cats may have signs of dehydration (reduced skin turgor and tacky mucous membranes), hypovolemia (tachycardia, hypothermia, poor pulse quality, pale mucous membranes) and cardiac dysfunction (bradycardia or other dysrhythmias).

The presence of a blocked bladder is usually easy to determine by careful abdominal palpation; if there is any doubt whether or not the palpable structure is the bladder, then ultrasound can be used but is rarely necessary. Care should be taken as it is possible to rupture a blocked bladder. Bladder size varies, although the bladder is usually large, turgid and painful by the time the cat is presented. If the obstruction is not relieved, the bladder will become increasingly distended and eventually the bladder wall may lose some of its elasticity (detrusor atony). Rarely, the bladder ruptures spontaneously and may not be palpable. The external genitalia should be examined to see if a mucous plug is extruding from the penis.

A minimum of PCV, total solids, glucose, urea, sodium and potassium should be measured. Ionized calcium and blood gases are useful if available. If the cat has a fast, slow or irregular heart rate then an ECG should be taken. Changes associated with hyperkalemia include spiking of T waves, loss of P waves and widening of the QRS complex, progressing to ventricular dysrhythmias, ventricular fibrillation and asystole. A urine sample should be collected for analysis either following successful catheterization or by cystocentesis (see below).

Treatment

Blocked cats that are otherwise well and not azotemic or hyperkalemic should be sedated or anaesthetized for bladder catheterization.

Cats that have cardiovascular compromise due to hypovolemia, azotemia or hyperkalemia should be stabilized prior to sedation or anesthesia.

- ☑ An IV catheter should be placed and fluid therapy started with 0.9% saline or Hartmann's solution (administering boluses of 5–10 ml/kg if hypovolemia is present)
- ☑ Mild hyperkalemia usually improves with fluid therapy and relief of the obstruction. Life-threatening hyperkalemia (>7.5 mmol/L, or associated with a severe dysrhythmia) may require specific treatment:
 - Calcium gluconate (0.5–1 ml/kg of 10% solution given slowly IV over 10 min) helps protect the heart against the effects of hyperkalemia
 - An IV bolus of glucose (0.25–0.5 g/kg) and glucose added to the IV fluids (to make a 2.5–5% solution) will help transport potassium into the cells (thus reducing serum potassium concentrations) and reduce the risk of hypoglycemia if insulin is used
 - Neutral (regular) insulin will help lower potassium (0.1–0.25 IU/kg IV or IM) but can cause hypoglycemia and is rarely used by the author
 - Sodium bicarbonate (1 mEq/kg IV) can also be administered, but is rarely required and can be associated with serious complications including hypocalcemia, resulting in tetany or seizures.

Relief of the urethral obstruction usually requires sedation or general anesthesia. Suitable sedative drug choices include ketamine/benzodiazepine combinations, or opioid/benzodiazepine combinations if cardiac abnormalities are present. Using sterile technique, the penis is extruded and a lubricated catheter (ideally an open-ended tom-cat catheter or lachrymal cannula) is gently fed into the tip of the urethra. It is useful to grip the prepuce around the penis to hold it in an extruded position whilst the catheter is being placed, to prevent the penis slipping back inside. Once the catheter is within the urethra, the penis is allowed to retract within the prepuce. The prepuce is then pulled dorsally and caudally towards the base of the tail to straighten the urethra as the catheter is advanced further. When resistance is felt, the catheter is flushed with pulses of sterile saline to help dislodge the plug. This may need to be done many times before the catheter can be advanced fully. Care is essential as the urethra is easily damaged by traumatic manipulation of the catheter. Once the obstruction has been relieved, the bladder is flushed repeatedly with saline until as much debris as possible has been removed. Occasionally, no physical obstruction is met; these cats are thought to suffer from urethral spasm and may respond to medication with anti-spasmodic drugs. They may require repeated or indwelling catheterization whilst the drugs take effect. Anti-spasmodic drugs such as dantrolene (0.5–2 mg/kg PO q12 h) and prazosin (0.25–1 mg/cat PO q8–12 h) can also be useful to help prevent short-term recurrence of obstruction in cats with physical causes of obstruction.

If it is not possible to catheterize the urethra, then cystocentesis can be performed to provide short-term relief to the bladder. There is a small risk of causing uro-abdomen if an over-distended bladder wall with reduced elasticity tears or continues to leak urine through the cystocentesis site. If the urethral obstruction is still impossible to relieve on repeated attempts, a cystostomy tube may need to be placed as a temporary measure whilst urethral anti-spasmodic drugs are initiated.

Following successful catheterization, it is usually recommended that a suitable catheter is sutured in place for at least 24–48 hours. This is particularly important if the cat is unwell, there is excessive hemorrhage

or debris in the bladder, or detrusor atony is present. A soft, flexible catheter should be used as this will be less irritant to the inflamed bladder wall. The catheter should remain in place until the cat is alert and well, and the urine appears almost normal. Following removal of the catheter, the cat should be closely monitored to ensure it can urinate comfortably. If detrusor atony is present, the cat may be unable to fully empty the bladder, and the bladder will have reduced tone (i.e., a soft, non-turgid bladder will be palpable even immediately after observed urination). This can take days to weeks to improve, and may contribute to recurrence of clinical signs.

Following catheterization of critically ill cats, monitoring of urine output and serum potassium concentrations is important. Post-obstructive diuresis is common, and dehydration can develop if adequate intravenous fluids are not administered to account for this. Hypokalemia can develop in the post-catheterization period, requiring supplementation of IV fluids with potassium chloride.

Opioid analgesia (e.g., buprenorphine) should be provided in all cases. In alert, non-azotemic patients, following successful relief of the obstruction, NSAIDs may be useful to reduce inflammation. Ideally antibiotics should not be given whilst the urinary catheter is in place as this encourages development of resistant organisms. The catheter's tip should be cultured at the time of removal and antibiotics given if necessary. Patients suspected to have urethral spasm may benefit from treatment with dantrolene and prazosin. Further treatment and dietary/behavioral advice should be given as for management of FIC, and the owner warned of the possibility of recurrence.

What if it doesn't get better?

If the urethral obstruction cannot be relieved, an emergency perineal urethrostomy may be required, or a cystostomy tube placed until urethrostomy can be performed. If an individual cat suffers repeated obstructive episodes, further investigations (complete urinalysis, ultrasonography and/or contrast radiography) should be undertaken to evaluate any underlying disease, as for cats with repeated episodes of non-obstructive LUTD¹. Cats with repeated episodes which do not respond to appropriate medical/behavioral management may benefit from perineal urethrostomy; however, this is potentially associated with complications such as stricture formation, urinary tract infection and ongoing cystitis.

The low-cost option

Cats that are presented early in an obstructive episode, whilst still alert and well, and when the obstruction is easy to remove, can be managed relatively inexpensively with minimal blood tests, sedation, and short-term catheterization. Critically ill cats require intensive monitoring and treatment which will inevitably be more expensive. However, if well managed, the prognosis is usually good, even for critically ill cats, and attempts should be made to treat the cat and relieve the obstruction within the financial limitations imposed by the owner. Appropriate dietary and behavioral advice should be given to minimize the risk of recurrence, as some owners will opt for euthanasia if they are unable to meet the costs of repeated episodes.

When should I refer?

Most obstructed cats can be successfully managed in general practice. Referral should be considered if the urethral obstruction cannot be relieved. It should also be recommended if facilities/expertise are not available for further investigation or treatment (medical, behavioral or

¹ Lower Urinary Tract Disease (LUTD)

surgical) of cats with recurrent episodes of obstruction. Perineal urethrostomy should be performed by a surgeon experienced in the technique.

Source

“*100 Top Consultations in Small Animal General Practice*” – Peter Hill, Sheena Warman, Geoff Shawcross.