

EMERGENCY TREATMENT OF CATS WITH URETHRAL OBSTRUCTIONS

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Cats with urethral obstruction are one of the true feline emergencies. They may present with marked hyperkalaemia. Cardiovascular protection is paramount via administration of calcium gluconate (1-1.5 mls/kg 10% calcium gluconate) to re-establish membrane excitability. If given too quickly it will cause further bradycardia and ventricular arrhythmias. Calcium gluconate will not lower serum potassium concentration, it's benefit is predominantly in stabilising the patient prior to administration of treatments that will redistribute or excrete potassium.

Intravenous fluid therapy and relieving the obstruction are likely the two most important factors in resolving electrolyte derangements.

Redistribution of potassium using dextrose (0.5 g/kg IV bolus) increases endogenous insulin and moves potassium intracellularly. Insulin (rapid acting insulin 0.25-0.5 IU/kg) may also be required and ongoing supplementation with dextrose to prevent hypoglycaemia is important. β_2 agonists (e.g. salbutamol) stimulate the Na⁺/K⁺ ATPase pump to move potassium intracellularly. Although not evaluated in cats, giving three to four puffs of inhalational salbutamol is a quick and rapid treatment that might be helpful.

Sedation of cats with urethral obstruction warrants consideration. Insufficient sedation can result in further urethral spasm and increased risk of urethral trauma. Sedation options include midazolam (0.25-0.5 mg/kg IV) and ketamine (5 mg/kg IV) OR buprenorphine (0.01-0.02 mg/kg IV) and midazolam (0.25-0.5 mg/kg IV). A coccygeal epidural also provides useful regional anaesthesia. [See video here XX](#). Alfaxalone can be titrated to effect.

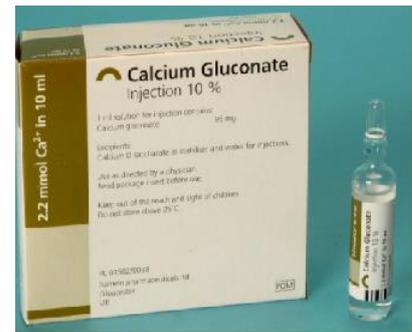
A coccygeal epidural is easily performed. It will block the pudendal and pelvic nerves innervating the penis, anus, colon and perineal region. Using a sterile technique, local anaesthetic agents are injected into the sacrococcygeal epidural space. This is identified by locating the most mobile joint caudal to the sacrum (palpating the junction between the sacrum and the coccygeal vertebrae and flexing the tail).

Using a 25G needle, bevel facing the tail, insert the needle at a 30-45-degree angle (needle only). Advance and feel for the "pop" which is the needle passing through the ligamentum flavum. Attach the syringe and gently aspirate to ensure no flashback of blood. Inject 0.1-0.2 ml/kg lidocaine 2% or bupivacaine (average volume 0.3-0.5 mls). A combination of bupivacaine and morphine is also useful and will provide a longer period of analgesia than bupivacaine alone. Appropriate application should result in a flaccid tail. The procedure can be repeated twice, however upstream absorption could result in effects on other nerves. Complications overall seem to be minimal. Decompressive cystocentesis (DC) is a controversial topic. Decompressive cystocentesis is the removal of urine from the bladder via percutaneous cystocentesis before placement of a urinary catheter. As long as the majority of urine volume is removed in one drainage (i.e. one single needle insertion), the procedure appears well tolerated.

Intraurethral atracurium instillation has been reported to aid urinary catheter placement. Atracurium is a neuromuscular blocking agent causing profound local skeletal muscle relaxation. In a study of male cats with obstruction in postprostatic/penile urethra, intraurethral atracurium appeared to aid plug removal at the first attempt and a shorter time to removal of the plug. No side effects were reported. Atracurium has a low liposolubility and limited systemic absorption.



Atracurium can be used for difficult to catheterise cats



Calcium Gluconate



The reported protocol is 0.2 mls of atracurium (10 mg/ml) diluted in 3.8 mls of 0.9% NaCl (concentration of 0.5 mg/ml) is gently instilled over 5 minutes whilst pinching the urethral orifice to prevent leakage. After instillation, proceed with flushing and unblocking.

Urinary catheter selection is important. Rigid catheters (e.g. polypropylene) may cause more urethral trauma and are more reactive and irritating. They may be useful for unblocking but should not be indwelling. Polytetrafluoroethylene/polyurethane catheters (e.g. Slippery Sam™) are firmer at room temperature and soften at body temperature and can be used for both unblocking and ongoing management which may result in less urethral trauma.

One retrospective study suggested that smaller (3.5 Fr) catheters decreased the risk of recurrence (3.5 Fr Vs 5 Fr (6.7% vs 19%)). It is also possible to estimate the appropriate length of the urinary catheter by measuring from the penis to the 4th mammary gland.

Be generous with sterile lubrication of the catheter.

A combination of saline and sterile lubricant is used for flushing the urethra if the urethra feels gritty. In cases of functional obstruction (e.g. urethral muscle spasm) flushing is not required during catheter placement.

Once the catheter has been passed into the urinary bladder, urine is emptied, and the bladder flushed with sterile saline until clear utilising a three way tap system attached to the urethral catheter to keep the system as closed as possible. The saline used for flushing can be chilled to help reduce inflammation.

Urinary catheters are left in place until urine is grossly clear (approximately 24-48 hours). Urinary catheters can be left to open to drain urine freely. Advantages of this would be less weight on the penis and improved patient comfort. Potential complications however include an easier route of infection into the bladder and urine scalding.

Closed drainage systems can also be attached, however it is important to consider how "drag" on the system maybe reduced. The Mila urine drainage bag is very useful as it has a swivel mechanism at the connector



Mila closed system urine bag

to the catheter that reduces accidental twisting of the collecting system and can also be easily tied to the cage to support the bag as it fills with urine. Gloves should be worn when handling the catheter and the drainage system. The system should not be allowed to contact the floor and should be inspected daily to ensure they are not soiled or disconnected. Cleaning of the prepuce of visible gross debris and material is only performed if required.

Patients should receive analgesia (e.g. buprenorphine 0.01mg/kg IV/IM/SQ/sublingual q 6-8 hours). Meloxicam can also be considered once patients have been rehydrated and azotemia has resolved. One study failed to show a benefit for meloxicam use in cats with idiopathic cystitis, however cats were only followed for 5 days.

Other treatments include urethral muscle relaxing agents. Increased smooth muscle tone is likely to be present in many cats and function obstructions have been reported in one study in 53% of cats with lower urinary tract obstructions. The author routinely uses $\alpha 1$ antagonists such as prazosin to decrease urethral pressures. Phenoxybenzamine appears less effective and can take up to 7 days to take effect. Acepromazine causes sedation and has no effect in the penile urethra. The author uses prazosin 1 mg-2 mg per cat, three times daily whilst cats are hospitalized and twice daily when discharged. Prazosin is continued for approximately 10-14 days.



Ensure you use plenty of sterile lubricant gel on the urinary catheter



Analyzer			
Model:		GEM® Premier 5000	
Area:		VSS	
Name:		AES	
S/N:		17040688	
Results			
		Crit. Low	Crit. High
Measured (37.0°C)			
pH	↓ 7.18	[-- 7.35	7.45 --]
pCO ₂	↓ 33 mmHg	[-- 35	45 --]
pO ₂	↓ 48 mmHg	[-- 50	105 --]
Na ⁺	142 mmol/L	[-- 142	150 --]
K ⁺	↑ 11.8 mmol/L	[-- 3.4	4.9 --]
Cl ⁻	113 mmol/L	[-- 110	125 --]
Ca ⁺⁺	↓ 0.81 mmol/L	[-- 1.12	1.40 --]
Hct	45 %	[-- 35	50 --]
Glu	↑ 16.3 mmol/L	[-- 3.5	6.0 --]
Lac	↑ 4.3 mmol/L	[-- 0.5	2.0 --]
tBill	incalc. µmol/L	[-- 0	10 --]
CO-Oximetry			
tHb	↑ 15.4 g/dL	[-- 1.2	1.7 --]
O ₂ Hb	59.0 %	[-- --	-- --]
COHb	1.4 %	[-- --	-- --]
Methb	0.8 %	[-- --	-- --]
HHb	38.9 %	[-- --	-- --]

A blood gas analysis showing a severe hyperkalemia in a cat with urethral obstruction



Free abdominal fluid can be seen adjacent to the bladder in many cats with urethral obstruction due to significant inflammation of the bladder

