Obstructive Feline Lower Urinary Tract Disease: The Critical First Hour

Franziska Meyer, Dr. med. vet., DACVECC, FVH

Introduction

Feline lower urinary tract disease (FLUTD) is a **frequent emergency presentation in small animal practice**, particularly affecting male cats. The initial clinical priority is to **differentiate obstructive from non-obstructive FLUTD**, as urinary obstruction represents a life-threatening condition requiring immediate stabilization and decompression.
Non-obstructive FLUTD, commonly caused by **feline idiopathic cystitis or bacterial cystitis**, typically presents without severe systemic illness. In contrast, obstructive FLUTD may range from mild clinical signs to **severe metabolic derangements and cardiovascular instability**. Recurrence is common, making the condition both emotionally and financially challenging for owners.

Epidemiology and Risk Factors

Obstructive FLUTD occurs predominantly in **male cats**, due to their longer and narrower urethra.
Additional risk factors include:

- young age
- obesity
- reduced physical activity
- indoor lifestyle

Reported incidence ranges from **0.6% to 5%**, and recurrence rates between **11% and 36%** have been described.

Etiology of Urethral Obstruction

Multiple underlying causes may lead to urethral obstruction:

- idiopathic urethral spasm or mucosal edema
- urethral plugs or inflammatory debris
- urolithiasis
- urethral strictures
- neoplasia (e.g., transitional cell carcinoma)

Idiopathic obstruction is the most common cause and accounted for approximately **53% of cases in one study**.

Clinical Presentation and Diagnosis

Diagnosis during the initial emergency assessment is largely based on **history and clinical examination**.

Common clinical signs include:

- stranguria
- little or no urine production
- vocalization or agitation
- vomiting and lethargy

Physical examination findings may include:

- a **large, firm, painful bladder**
- bradycardia or tachycardia
- hypothermia in severe cases
- penile discoloration or crusting
- signs of shock or altered mentation in advanced cases.

Laboratory testing typically reveals:
- **hyperkalemia**
- **post-renal azotemia**
- metabolic acidosis

Diagnostic imaging such as **radiography** may help identify uroliths.

Pathophysiology

Urethral obstruction leads to **increased bladder pressure**, which reduces glomerular filtration rate and results in **post-renal azotemia**. Progressive retention of potassium and metabolic acids leads to **life-threatening hyperkalemia and acidosis**.
Mucosal edema and reflex urethral spasm may further perpetuate the obstruction.

Hyperkalemia: The Main Cause of Mortality

Hyperkalemia is the **most life-threatening complication** of obstructive FLUTD.
Contributing mechanisms include:
- reduced renal potassium excretion
- decreased glomerular filtration
- potassium shifts caused by metabolic acidosis
- release of intracellular potassium from tissue damage

Typical electrocardiographic changes include:
- peaked T waves
- atrial standstill
- widened QRS complexes
- bradycardia

Severe cases may progress to **ventricular arrhythmias or asystole**.

Emergency Stabilization

Initial management focuses on **rapid stabilization prior to de-obstruction**.
Key steps include:
- immediate intravenous access
- opioid analgesia (e.g., methadone or fentanyl)
- balanced crystalloid fluid therapy
- treatment of hyperkalemia when indicated
- administration of maropitant to reduce vomiting and aspiration risk

Non-steroidal anti-inflammatory drugs should **not be administered during the acute phase**, particularly in azotemic patients.

Management of Hyperkalemia

Mild hyperkalemia:
- restore urine flow through catheterization
- fluid therapy to increase renal perfusion

Moderate to severe hyperkalemia:
- dextrose with or without insulin
- beta-agonists such as terbutaline
- calcium gluconate for cardioprotection
- bicarbonate therapy in selected cases

Decompressive Cystocentesis

Advantages:
- rapid bladder decompression
- no sedation required
- potential reduction of back pressure

Potential risks include **iatrogenic bladder rupture or uroabdomen**. However, several studies have reported **no significant increase in complications** with single decompressive cystocentesis.

Urinary Catheterization

Preparation
- sedation and analgesia
- clipping and aseptic preparation
- sterile gloves and draping
- appropriate catheter selection

Sedation and Analgesia
Common protocols include combinations of:
- methadone
- midazolam
- ketamine
- alfaxalone or dexmedetomidine

A **sacrococcygeal epidural block with lidocaine** may provide additional analgesia and facilitate catheterization. Continuous monitoring of ECG, blood pressure, and oxygen saturation is recommended.

Catheter Types
Various urinary catheters are available.
- **3.5 French catheters** may reduce recurrence compared with larger sizes.
- Polypropylene catheters are useful for de-obstruction but should not remain indwelling.
- Polyurethane and PTFE catheters are commonly used for indwelling catheterization.

Alternative Catheterization Techniques
If retrograde catheterization fails, alternative approaches include:

- **antegrade urethral catheterization using a guidewire**
- **percutaneous pigtail cystostomy catheter placement**

These techniques may be useful in distal obstructions or urethral trauma.

Complications of Catheterization
- urethral trauma or rupture
- uroabdomen
- urethral strictures

Catheter-associated urinary tract infections may develop during hospitalization, although **prophylactic antibiotics are not recommended**.

Post-Obstructive Management

Following successful de-obstruction, management focuses on monitoring and supportive care.
Key aspects include:
- careful fluid therapy based on INS and OUTS
- monitoring for **post-obstructive diuresis**
- analgesia and stress reduction
- cautious use of alpha-1 blockers (e.g., prazosin)

Electrolyte abnormalities such as **hypokalemia and hypophosphatemia** may occur during recovery and require monitoring.

Recurrence and Long-Term Management

Recurrence of obstruction is common, with rates reported up to **40% within one year**.
Long-term management strategies include:
- therapeutic urinary diets
- increased water intake
- environmental stress reduction
- early recognition of clinical signs by owners

In refractory cases, **perineal urethrostomy** may be considered.

Prognosis

When treated promptly, **short-term survival is excellent.** However, recurrence remains the primary challenge.
Surgical management such as **perineal urethrostomy** has high success rates but carries risks including hemorrhage, urethral stricture, and recurrent urinary tract infections.