

# Surgical Management of Urethral Obstruction Thursday, April 29, 2021

Leah Miller, DVM,  
Residency Trained in Veterinary Surgery  
[Leah.Miller@MedVet.com](mailto:Leah.Miller@MedVet.com)

# Objectives

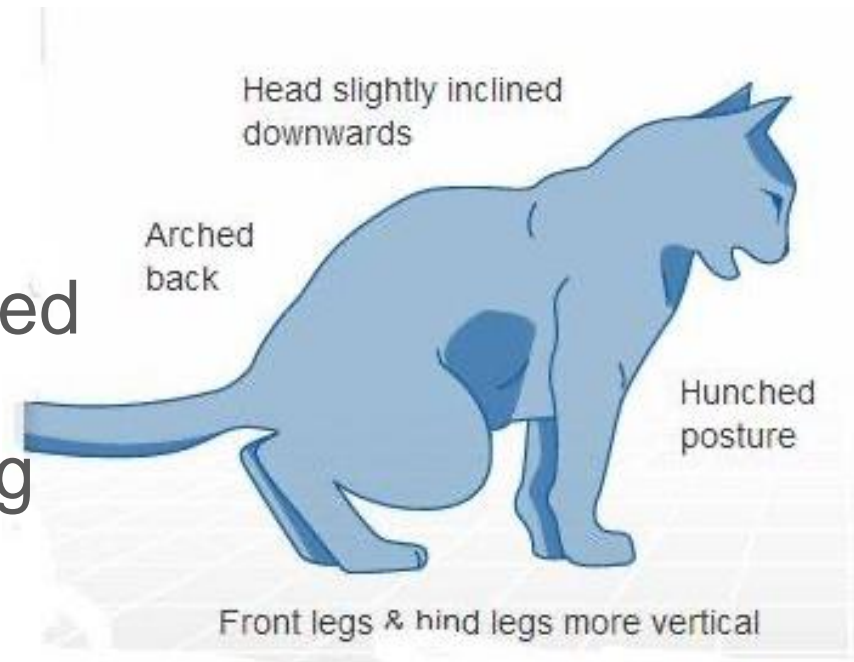
1. Diagnostics
2. Stabilization
3. Surgical Management

# Volt

- 2 yr MC DSH
- Presented to ER for a 1 week history of urinary issues
  - Laying in litter box, excessive grooming, and growling at the owners
  - Progressed the night of presentation

# Classic lower urinary signs

1. Straining to urinate
2. Urinating small amounts
3. Frequent and/or prolonged attempts to urinate
4. Crying out while urinating
5. Excessive licking of the genital area
6. Urinating outside the litter box
7. Blood in the urine



<https://www.vethospital.co.nz/post/feline-idiopathic-sterile-cystitis-fic>

# Volt's Physical examination

- Vitals
  - T: 100.2
  - P: 230bpm
  - RR: 90rpm
- ~ 7% dehydrated
- Bladder large, firm, and painful
- Urethral spasm

# Urinary obstruction

- Reported in 18-58% of male cats with lower urinary tract disease
- After obstruction for 2-3 days uremia occurs.
- Prolonged bladder distention leads detrusor atony and loss of contractile function

**What is the period that an undiagnosed obstruction can ultimately lead to death?**

- A. 5-7 days
- B. 3-6 days
- C. 24-48 hours
- D. 7+ days

- The most common causes of urinary obstruction in cats:
  - Urethral plug – 60%
  - Idiopathic – 30%
  - Uroliths – 10%
- Other potential causes of urethral obstruction:
  - Neoplasia
  - Granuloma
  - Bladder displacement or herniation
  - Strictures
  - Urethral trauma
  - Prostatic disease
  - Blood clot



- Most common location of urethral obstruction in dogs vs cats:
  - Dogs – ischial arch or immediately caudal to the os penis
  - Cats - distal third of the urethra
- Most common cause of urethral trauma in dogs vs cats:
  - Dogs, 70% secondary to vehicular trauma
  - Cats, 79% secondary to urethral obstruction and urinary catheterization

# Diagnostics to perform

- Blood work
  - CBC - WNL
  - Chemistry
    - Hyperglycemia
    - Elevated creatinine
- Urinalysis
  - USG 1.047
  - 3+ blood
  - 3+ Protein
  - pH 7.5
  - 2-5 wbc/hpf
  - >100 rbc/hpf
  - 3+ struvite crystals

- Urine Culture
  - negative
- Abdominal Imaging
  - Radiographs
  - Ultrasound

Also consider blood pressure and EKG

# Common abnormalities on bloodwork:

- Leukocytosis
- Increased hematocrit
- Azotemia
- High normal to high potassium
  - Secondary to decreased GFR
- Hyponatremia

# Common findings on UA

- Hematuria
- Proteinuria
- Glucosuria
- Alkylurina
- Bilirubinuria
- Pyuria
- Bacteriuria
- Struvite crystaluria
- Epithelial cells
- Granular casts



# Initial UO management

- Obtain hemodynamic stability
- Correct metabolic derangement
  - The threshold at which cardiac abnormalities can be seen with hyperkalemia is  $>8.5$  mEq/L
  - EKG abnormalities
    - Bradycardia
    - Prolonged QRS width and PR intervals
    - Spiked T waves
    - Ventricular arrhythmias
  - Treatment of severe hyperkalemia
    - Sodium bicarbonate
    - Glucose and insulin
    - Calcium
    - Hypertonic saline
- Urinary catheter placement

# In the event that a urinary catheter cannot be placed?

- Urohydropropulsion
  - Improving urohydropropulsion
    - Multiple catheter sizes
    - Lubrication
    - Local and general anesthesia
- Decompressive cystocentesis
  - Pros and cons
  - Materials needed
- Cystostomy tube



# Radiographs



# Urinary Calculi

- The most common calculi responsible for feline urinary obstruction
  - Struvite
  - Calcium Oxalate
- Radiopaque and non-radiopaque calculi in canines and felines
  - Radiopaque
    - Struvite, calcium oxalate, calcium phosphate
  - Non radiopaque
    - Cystine and urate



# Back to Volt...

- Volt was then anesthetized and a urinary catheter was placed
- Volt remained in hospital until 7/26, removing his own urinary catheter prior to it being in place for 24 hours
- Represented on 7/27 to the primary care veterinarian at which time he was treated with Onsior

# July 28

- Volt returned to MedVet Emergency
- T: 102.3F; P: 220bpm; RR: 50bpm
- Pain score 14/24 on palpation of urinary bladder
- <5% dehydrated
- 7cm firm, painful, non-expressible urinary bladder
- Urethral spasm with mild hemorrhage/bruising on urethra

# July 29

- Transferred to Surgery Service for perineal urethrostomy
- TPR WNL and urinary catheter in place
- Renal panel performed with resolved azotemia

# Urethra

- Three segments of the urethra
  - Preprostatic
  - Prostatic
  - Cavernous/membranous
- Blood supply to the urethra
  - Aorta -> Internal iliac -> internal pudendal -> prostatic urethral, and penile arteries

**The age at castration affects the mature urethral diameter in male cats?**

A. True

B. False

# Urethral Surgery

- Under optimal conditions the urethral mucosa regenerates in 7 days
- Potential factors that increase time frame to healing include:
  - Mucosal defect
  - Urine extravasation
  - Mucosal edema
- Suture type and size can affect healing and therefore the ideal suture is:
  - Synthetic absorbable monofilament
  - 4-0 or 5-0
- The urethra can have up to 60% narrowing of the urethral diameter prior to showing clinical signs of stricture.

# Perineal Urethrostomy

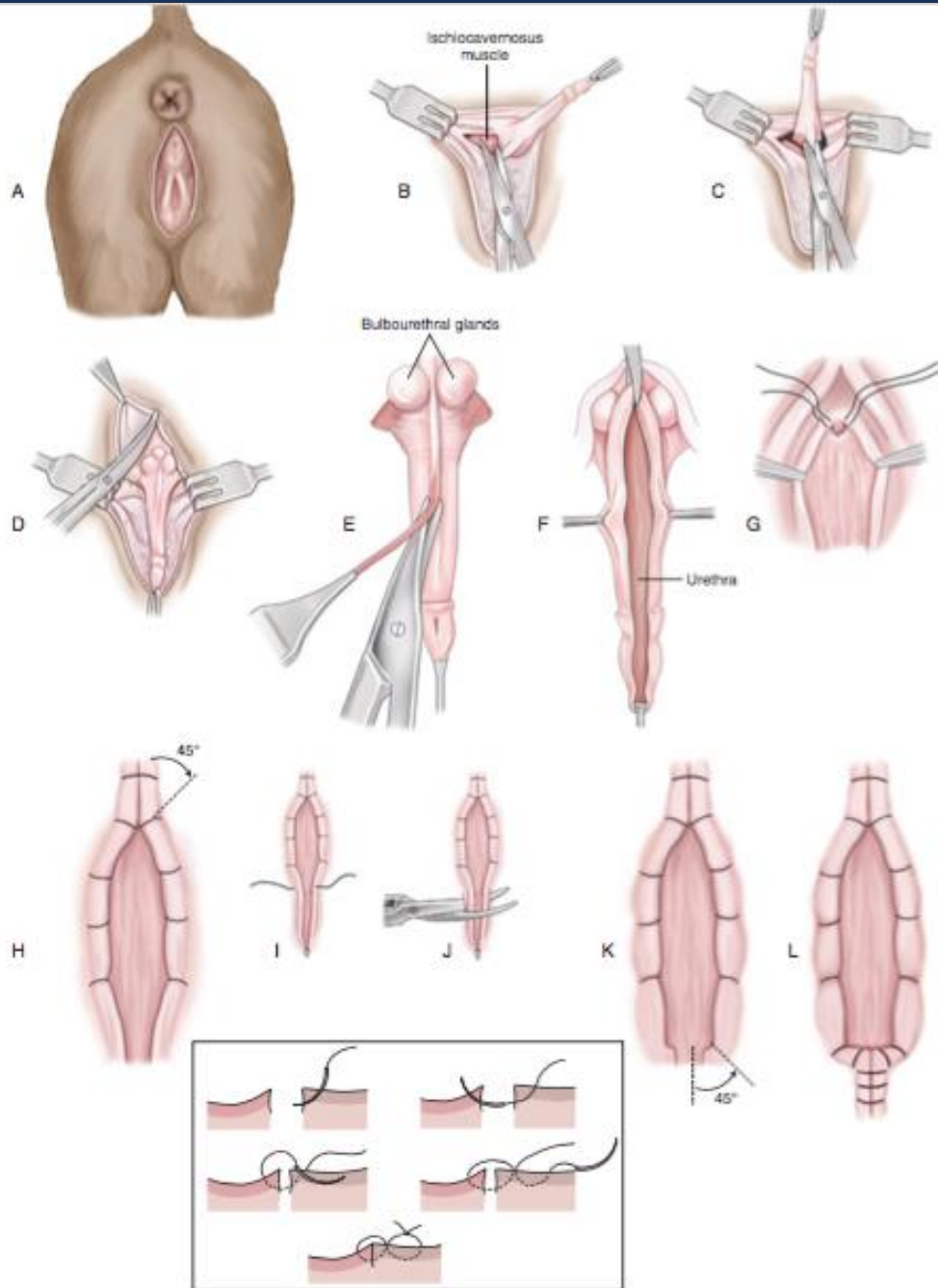
- Most common indication
  - Recurrent urethral obstruction
- Additional indications for surgery
  - Obstruction that cannot be relieved by catheterization and reverse flushing
    - Urolithiasis
    - Urethral stricture
    - Urethral trauma
    - neoplasia

# Discussion with Owners

- Risks and complications
  - Hemorrhage
  - Ascending urinary tract infections
  - Urethral stricture or trauma
  - Wound dehiscence
  - Urine leakage into perineal tissue
  - Scalding
  - Rarely incontinence (fecal or urinary), perineal hernia, rectourethral fistula
- **Surgery only relieves the obstruction, there is still medical management of FLUTD**







Veterinary Surgery,  
Small Animal Edition 1

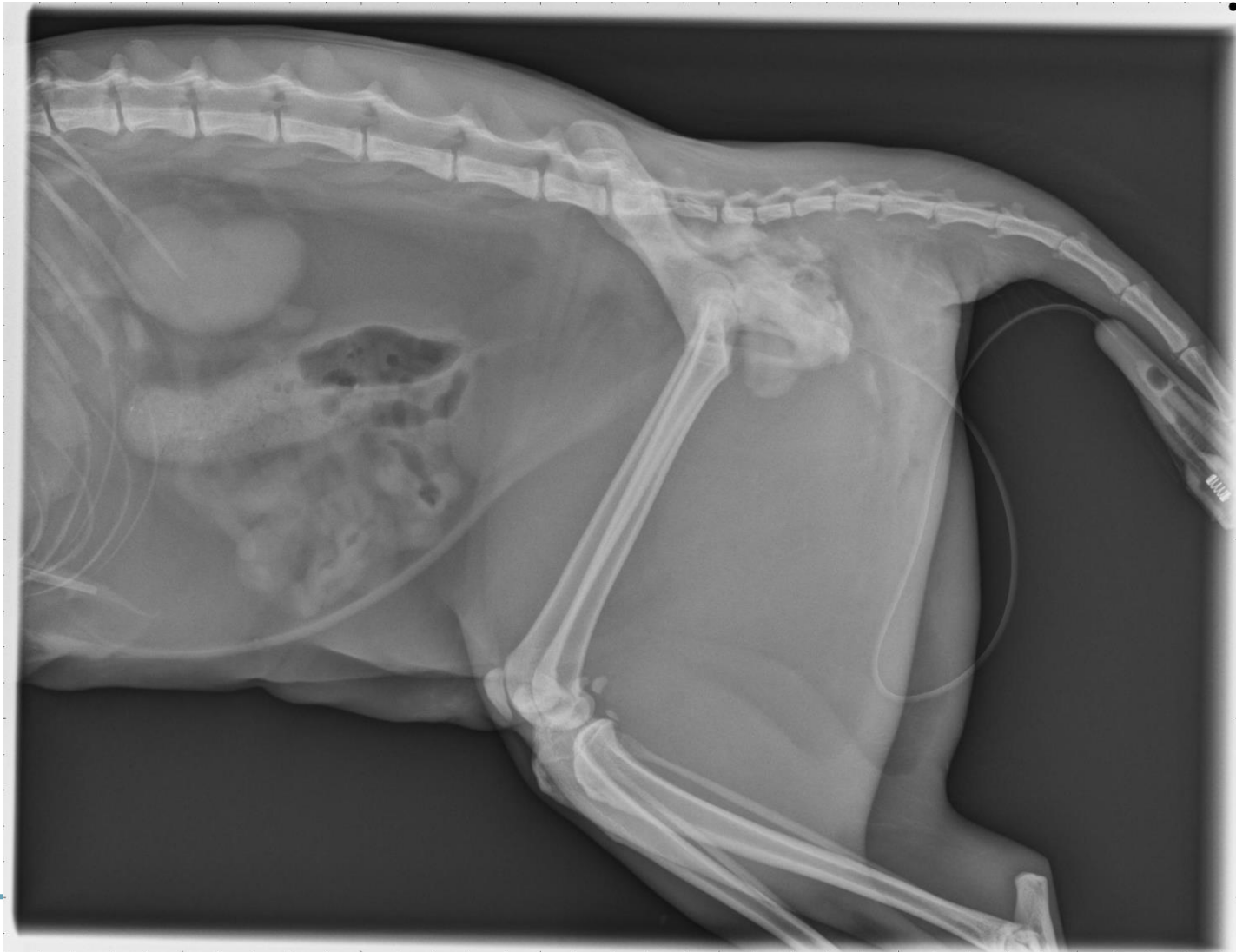
# 7/30

- Day 1 post-op
  - No urine production overnight
  - Volt went in the litter box and was noted to be uncomfortable
  - Physical examination
    - Mild right pelvic limb edema
    - Mild perineal bruising
  - Attempted urinary catheter placement

# Urethral Tears

- Clinical signs
  - Stranguria, dysuria, oliguria, anuria
- Cellulitis and bruising are characteristic physical examination findings with urethral tears
- Categories based on location of tear
  - Pre-pelvic
  - Intra-Pelvic
  - Post-pelvic
- Diagnostics
  - Contrast cystourethrogram

# Contrast Study



# Location of urethral tear



# Treatment options for urethral tear

- Healing by second intention with aide of urinary diversion (urinary catheter vs cystostomy tube)
- Primary repair
- Permanent urinary diversion

# Urinary Diversion

- Options
  - Transurethral catheterization
  - Cystostomy catheter
  - Urinary diversion into the GIT
  - Salvage permanent diversion
- How long?
  - Ideally until epithelialization is complete

# Salvage procedures

- Indications
  - Recurrent pelvic urethral obstruction
  - Failed PU in cats with idiopathic lower urinary tract disease
- Options
  - Prepubic urethrostomy
  - Transpelvic urethrostomy



# Final Outcome

- Volt remained hospitalized with an indwelling urinary catheter for 7 days
- He was discharged 10 days post op PU
- Reportedly doing well at home





# Questions?