ECHO Summary,25/OCT/2024
Session Title: Approach to Acute Urinary Retention and Priapism

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ECHO Session Panelists:
Experts
- Dr. Joseph Wadeya - General Surgeon and Urology Fellow, Mulago NRH
- Dr. Tracy Walczynski - EM Physician and SEED Educator, MUST EM Program

Patient Case Presenters
- Dr. Martha Nadunga - 3rd Year EM Resident, MUST EM Program
- Dr. Noah Matagala - General Surgeon, Fortportal RRH

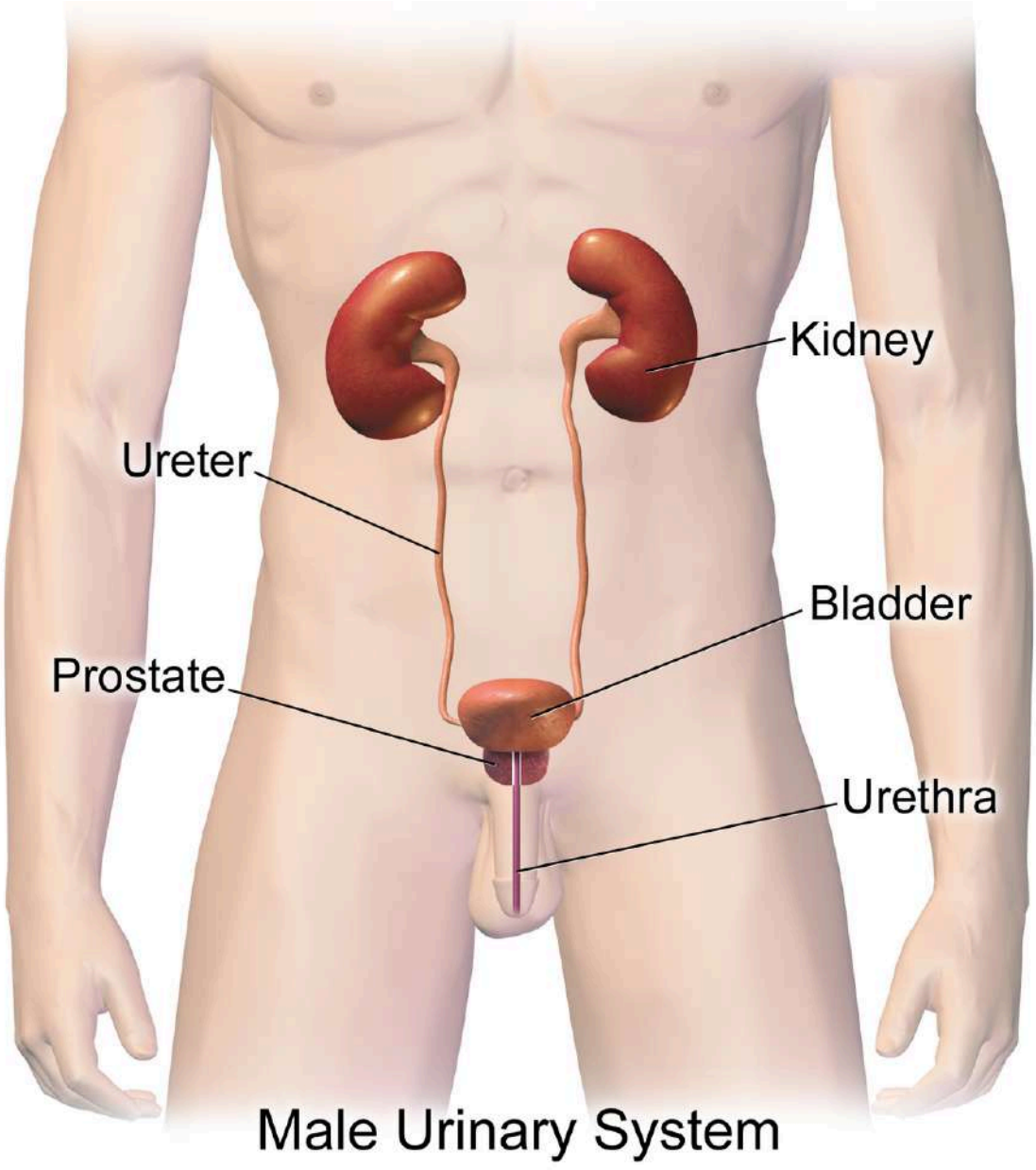
Moderator
- Mr. Donanto Mugumya - Critical Care Nurse and AHA Instructor, Samaritan Health Systems, Uganda

ACUTE URINARY RETENTION

Definition

Acute urinary retention is an inability to pass urine in the setting of a palpable or percussive urinary bladder. It is usually painful but may be painless in cases of neurologic dysfunction.

Figure 1. Anatomy of the urinary tract system. Urinary retention occurs due to obstruction distal to the bladder. This is a more common problem in men due to the fact that they have a longer urethra than women (so there is a longer distance over which things can “go wrong”), and they are subject to prostate enlargement with aging. Source: By BruceBlaus - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=61465355



Epidemiology

- Incidence increases with age and is a very common complaint among elderly men

- By far, the most common cause of acute urinary retention is benign prostatic hypertrophy (BPH), with estimates putting it as the primary causative etiology in 65% of cases of acute urinary retention in men
- Acute urinary retention is much less common in women, with an incidence estimated at 7 cases per 100,000 women per year

Risk Factors/ Causes

- Obstructive/anatomical: This is the most common reason for obstruction. This includes BPH, masses, stenosis, pregnancy, meatal strictures, and bladder neck tumors.
- Obstructive/luminal causes such as clots, stone
- Functional: cystitis, drugs such as anticholinergics (eg, tricyclic antidepressants, antihistamines, Jimson weed), anesthesia, benzodiazepines
- Neurologic: spinal cord compression (cauda equina, disc prolapse, tumor), stroke, trauma to the spinal cord
- Note: Trauma can cause retention from any of the categories. You have to look for this in trauma patients.

Clinical features

- **AIRWAY/BREATHING**: If you suspect a spinal lesion, be aware of respiratory status and support as needed
- **CIRCULATION**: Monitor for hypotension
- **DISABILITY:** A good neurologic exam is critical as urinary retention with new sensory or motor deficits, especially with back pain or trauma, might represent spinal compression
- **EXPOSURE**:
- **History:**
    - Ask about symptoms of GU infection, which can be a cause or complication of retention
    - Ask about hematuria, which could indicate stones
    - Ask about known prostate issues (BPH, prostate cancer) or symptoms such as hesitancy or poor stream that could suggest such
    - Ask about urologic procedures
    - Ask about new medication or substance use
- **Exam:**
    - Abdominal exam for suprapubic fullness or tenderness
    - GU exam looking for external causes, e.g urethral trauma, balanoposthitis, vulvovaginitis, phimosis, and paraphimosis.
    - Perform a digital rectal exam!
        - The prostate is enlarged and smooth in BPH but can be nodular in prostate cancer
        - Saddle anesthesia and poor rectal tone are signs of spinal cord compression
        - Fecal disimpaction can be performed to relieve constipation.
    - Complete a neuro exam for new neurologic deficits such as lower extremity motor weakness, saddle anesthesia, or abnormal reflexes.

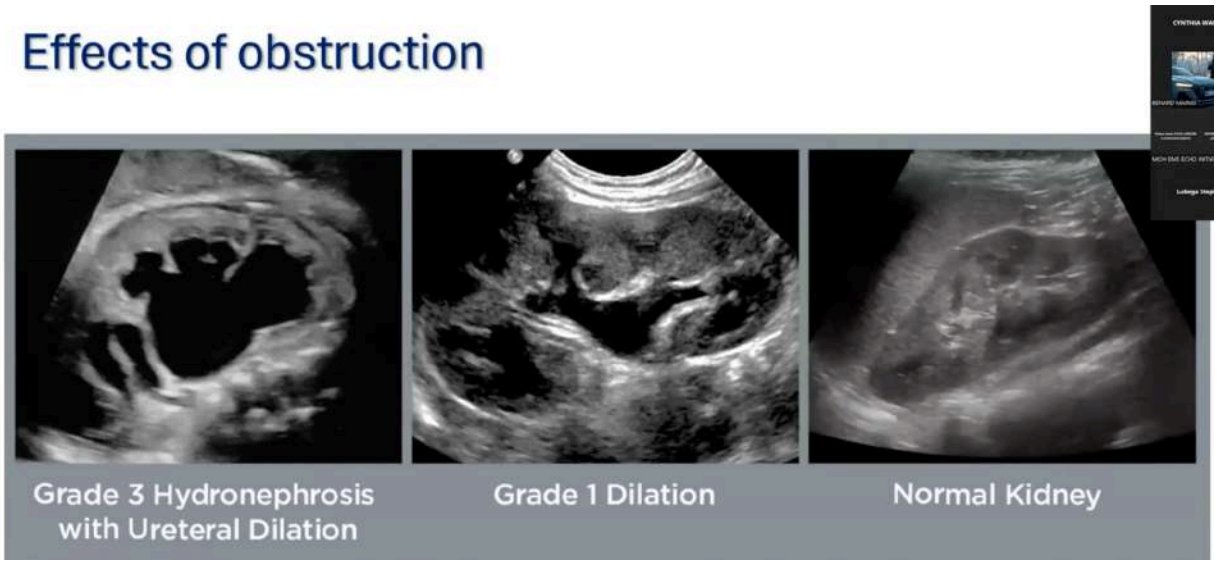
Diagnostics

- The diagnosis can be rapidly confirmed with measurement of post-void residual by a bladder scan or ultrasound.
- Workup for underlying causes or complications
    - Urine for microscopy, culture, and sensitivity
    - Complete blood count (CBC) to look for anemia or leukocytosis
    - Renal function tests (as urinary outlet obstruction can lead to post-renal acute kidney injury, AKI)
    - Ultrasound scan to measure bladder volume
    - KUB (if there is suspicion for kidney stones)
    - CT scan in cases of suspected neurological or traumatic causes
        - CT urogram may be helpful for patients with new-onset gross hematuria to look for obvious bladder masses that may suggest cancer

Treatment

- The mainstay of treatment in cases of urinary retention is bladder decompression.
    - This can be either urethral or suprapubic catheterization
    - Aim of catheterization: to protect the kidneys, relieve the pressure and for pain control
    - Who needs it?
        - No specific volume requirement, but a post-void volume > 100ml suggests retention
        - Painful bladder distension
        - Overflow incontinence with high post-void residual bladder volume (risk of infection)
        - Note: Don't catheterize trauma patients with bladder distension and blood at the meatus due to concern for urethral injury that can be made worse by catheterization. Consult Urology in this scenario

Figure 2. Hydronephrosis, which can be caused by sustained urinary obstruction. This is compared with the normal kidney. Source: Dr. Wadeya’s presentation.



Tip and tricks for insertion of urethral catheter

- Lubrication with KY or lidocaine jelly
- Tension on the penis at 90 degrees
- Advance to the Y junction of the catheter. If you inflate the balloon before this, there is a risk of urethral injury
    - There is always a possibility that you could inflate the balloon in the prostate or urethra if you haven't gone far enough!
- Use a larger size catheter (>/= 20Fr) if you suspect BPH. The smaller catheters are too flexible and soft to go through the constricted portion of the urethra
    - A coude (i.e. curved tip) catheter is stiffer and can also be helpful for navigating the enlarged prostate in BPH

Complications of placement

- Stricture
- Complete avulsion of the urethra

Disposition

Consider admission for:

- Chronic urinary retention
- Signs of infection, pyelonephritis
- Post-obstructive diuresis, > 200 ml/hour for 2 hours (which can put patients at risk for electrolyte derangements)
- Electrolyte derangements, especially hyponatremia
    - Fluid maintenance +/- hypertonic saline (but be cautious not to overcorrect this too quickly; the maximum correction is 12 meq of serum sodium over 24 hours to avoid causing osmotic demyelination syndrome)
- Trauma

You can discharge patients with acute uncomplicated urinary retention

- When to remove the catheter? - Usually outpatient after a trial of void
    - No specific timeframe, it is patient-dependent
- No need to start medications in the acute setting, but you can consider starting an alpha-antagonist such as tamsulosin

Special Notes

- While BPH is the most common cause, be prepared with a wide differential for acute urinary retention. The most time-critical diagnosis is spinal cord compression

PRIAPISM

Definition

Priapism is a painful, sustained (4h) unwanted erection. It is caused by engorgement of the corpus cavernosal bilaterally. Prolonged erection compromises blood supply and leads to damage to the smooth muscle responsible for erection, eventually leading to erectile dysfunction and impotence.

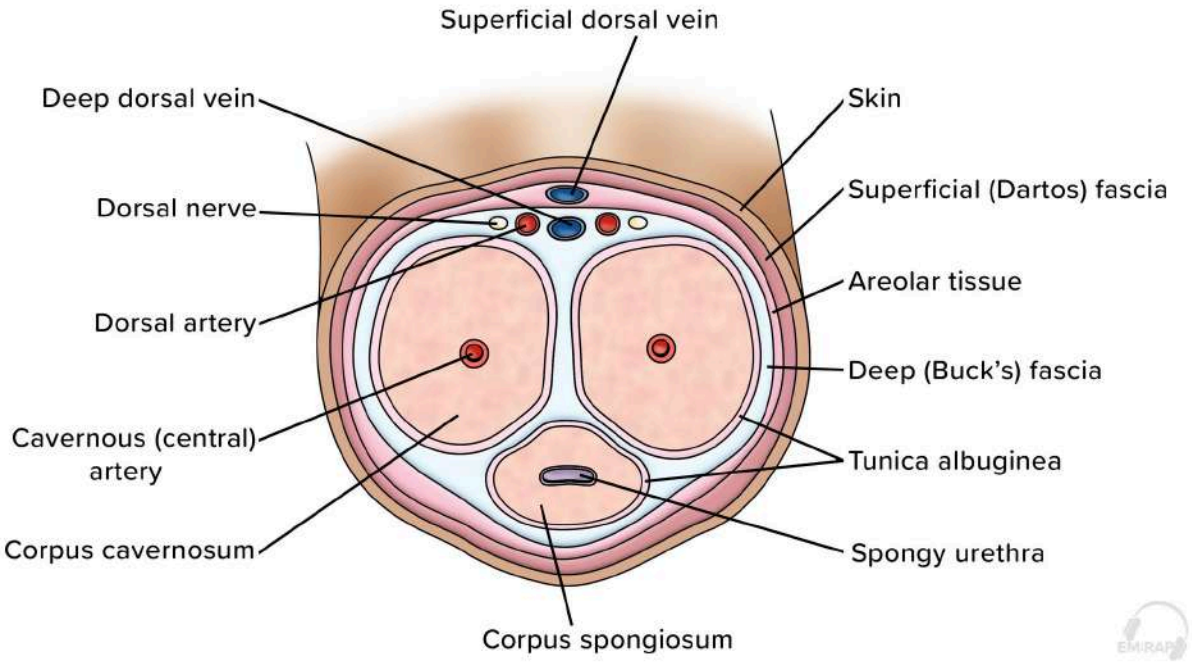
TIME IS CRITICAL
4h usually reversible
24h 90% irreversible
48h 100% irreversible

Types

Low-flow or ischemic: Decreased venous outflow results in increased pressure of the corpora cavernosa (Fig. 3)

- When cavernosal pressure exceeds arterial pressure, ischemia develops.
- This is an emergency
- Usually painful
- Risk factors: sickle cell disease, hematologic cancers, idiopathic, drugs (anticoagulation, pharmaceuticals [SSRIs, sedative-hypnotics, erectile dysfunction medications], Illicit drugs [cocaine, ecstasy])

Figure 3. Penile anatomy. Note that the corpora cavernosa are the structures that become engorged in low-flow or ischemic priapism. Source: Smith G. Cross Section of a Penis. Accessed December 2, 2024. https://www.emrap.org/corependium/chapter/recnInGnYqy3QZK5x/Male-GU-Emergencies#h.v5kawo8iwbtq



High-flow or non-ischemic: Excess arterial inflow resulting in priapism

- Non-emergent
- Causes: spinal cord trauma, arterial laceration
- Uncommon 2%

Diagnosis

- Clinical diagnosis based on history and exam
- Can obtain Doppler ultrasonography and/or cavernosal blood gas to differentiate ischemic vs. non-ischemic priapism
    - "Cavernosal blood gas can help distinguish between the two types of priapism, with the parameters of PO_2 >90 mm Hg, PCO_2 <40 mm Hg, and pH ~7.40 for non-ischemic priapism, and PO_2 <30 mm Hg, PCO_2 >60 mm Hg, and pH <7.25 for ischemic priapism" (Nguyen, 2021)

Management

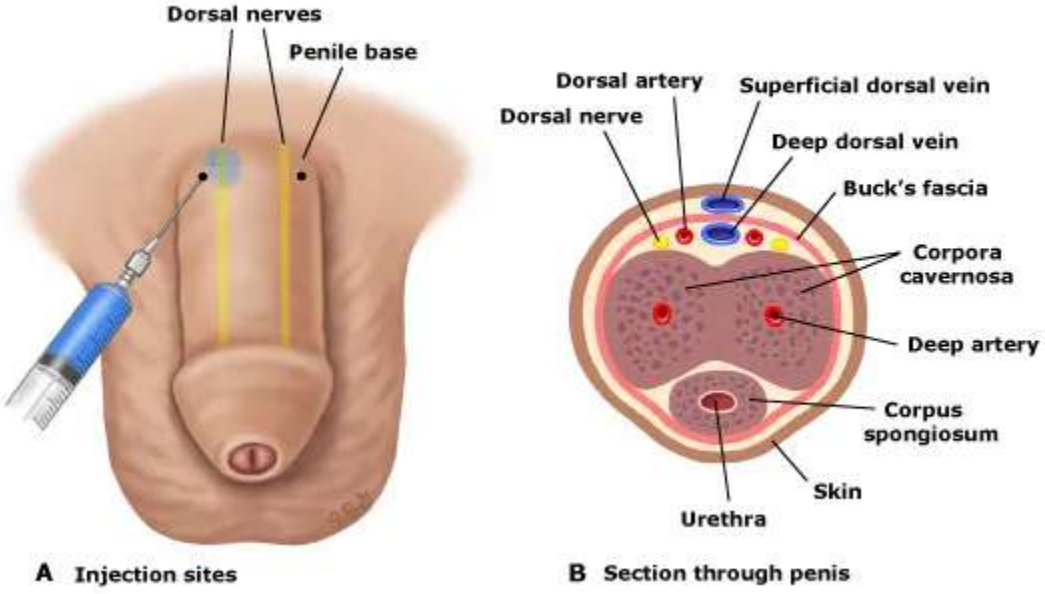
Educate

- Especially for high risk patients, such as those on offending medications or with sickle cell disease
- This helps them present early, in a timeframe that prevents long-lasting damage

Aspirate

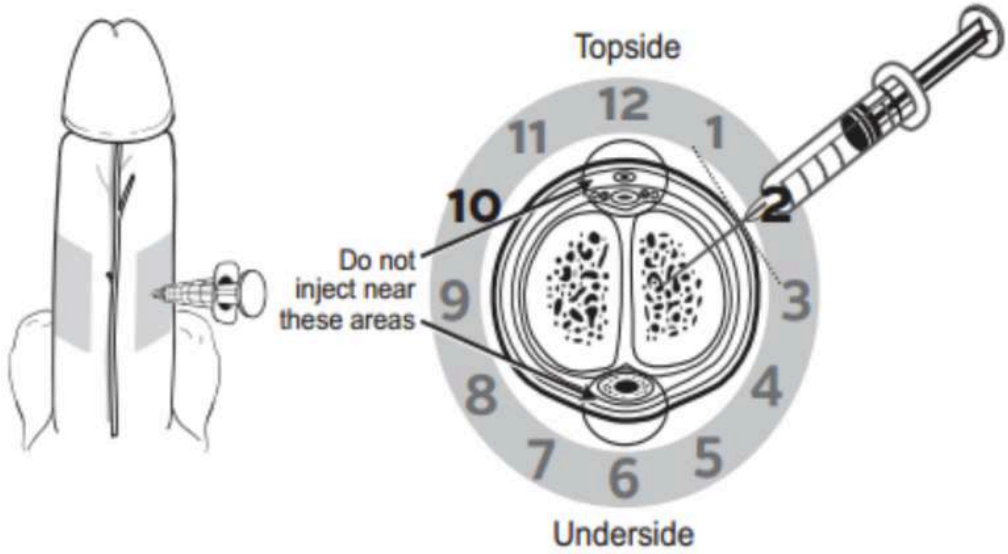
- Start with a dorsal penile nerve block (Fig. 4). This can be completed using lidocaine with epinephrine

Figure 4. Dorsal penile nerve block. Source: https://coreem.net/core/priapism/



Perform a dorsal cavernous aspiration (Fig. 5) using a large bore needle or cannula at the 2 and 10 o'clock positions. Aspirate about 20 - 40 ml of blood from each side (i.e. you are draining the corpora cavernosa). Only go in till you aspirate blood to avoid the central artery.

Figure 5. Dorsal cavernous aspiration. Source: https://coreem.net/core/priapism/



Irrigate

- Flush with 10-20ml normal saline on either side to loosen clots
- Then aspirate until you see arterial blood or achieve detumescence

Infiltrate

- Phenylephrine for vasoconstriction
- Must dilute: 10 mg/ml into 100ml = 100 mcg/ml
- Inject 1 ml (i.e. 100 mcg) into the bilateral corpora cavernosa every 5-10 min, for a maximum of 5 times

Surgical management

- If the above techniques fail, consult Urology for shunt placement
- Proximal or distal shunts reestablish corporal flow

Treat underlying cause

- Stop offending drugs
- Hydration may help
- Consult hematology for sickle cell disease and consider exchange transfusion

Disposition

- Most can go home after successful detumescence
- Place compressive dressing - placing large-bore needles into the penis can cause hematomas
- Urology follow up

Special Notes

- Ischemia and infarction can occur with prolonged priapism, and rapid treatment and detumescence are critical

Collaborating Partners

1. Ministry of Health of the Republic of Uganda
2. Seed Global Health
3. Techies Without Borders

References

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