Urological Emergencies

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Learning Objectives
At the end of the lecture the participant will be able to:
• Discuss the factors that constitute a urological emergency
• Explain the diagnostic work-up for the following:
  – Testicular torsion
  – Disrupted male urethra secondary to pelvic trauma
  – Acute urinary retention
  – Acute prostatitis and Urosepsis
  – Priapism
  – Paraphimosis
• List the treatment options for the following:
  – Testicular torsion
  – Disrupted male urethra secondary to pelvic trauma
  – Acute urinary retention
  – Acute prostatitis and Urosepsis
  – Priapism
  – Paraphimosis

What is Considered a Urological Emergency?

Pre-Test Outcome Questions
• Which of the following is considered a true urological emergency?
  – Acute hemorrhagic cystitis
  – Phimosis
  – Testicular torsion
  – Vesicourethral
  – Blood seen at the urethral meatus can indicate urethral disruption.
  – True
  – False
• Which of the following medications can cause acute urinary retention in persons with BPH?
  – Hydrochlorothiazide
  – Pseudoephedrine
  – Tamsulosin
  – Finasteride
• Priapism is considered a non-traumatic urologic emergency.
  – True
  – False
• Paraphimosis is defined as the inability to retract the foreskin behind the glans penis.
  – True
  – False

Epidemiology
• Urological patients seen or consulted for in the ED:
  – Male greater than female
  – Age average 54 years
  – Range 1 - 101
  – Most common problems:
    • Infection
    • Urinary retention (older population > 60 yrs)
    • Renal colic
    • Hematuria
    • Scrotal/penile problems (younger population - < 30 yrs)
    • Trauma

Urological Emergency
• Can be classified by:
  – Traumatic
    • Penile fracture
    • Penile amputation
    • Renal fracture
    • Urethral disruption, etc.
  – Non-Traumatic
    • Testicular torsion
    • Acute urinary retention
    • Priapism
    • Urosepsis
Definition

- Medical Emergency:
  - Sudden life/organ threatening occurrence necessitating rapid assessment, stabilization, and treatment that can include surgical intervention.
- There are not many true urological emergencies.
- An organ threatening urological emergent situation is testicular torsion.
- Appendage threatening urological emergent situations are ischemic priapism and penile amputation

Urological Urgencies

- Urologic urgency is a condition that requires medical attention and would not result in death or disability if not treated immediately but may develop such threats if not dealt with within 24 hours.
- Urgent situations can include:
  - Acute urinary retention
  - Urethral disruption
  - Ureteral injury
  - Acute prostatitis/urosepsis
  - Priapism – non-ischemic
  - Paraphimosis
  - Renal trauma
  - Penile fracture

Non-Traumatic Urological Emergency

- Testicular torsion:
  - Non-traumatic twisting of the spermatic cord and structures – vas and spermatic vessels
  - Congenital problem in approximately 14% of males
  - Caused by anatomical abnormality of anchoring tissue (tunica vaginalis) and is also known as a “Bell clapper” deformity.

Testicular Torsion

- Diagnosis:
  - Based on history:
    - Sudden onset of unilateral testicular pain of less than 24 hours duration (left more often affected than right)
    - Abdominal pain with nausea and vomiting
    - Scrotal swelling
    - Urinary frequency
    - Fever (rare)
  - Physical examination:
    - Often difficult to perform secondary to pain
    - Affected testicle is often “high riding” in the hemiscrotum
    - Scrotal edema and testicular edema often present
    - Scrotal erythema can be present

- Laboratory:
  - Urinalysis typically normal or may have a few RBCs present
  - Complete blood count typically normal though up to 60% of patients with torsion can have mildly elevated WBC counts
  - CRP – has been thought a good adjunct for differentiating inflammatory from non-inflammatory causes of scrotal pain but not enough data has been collected to make definitive recommendations to order this test

- Imaging studies:
  - If torsion is highly suspicious no time should be lost in getting the patient to surgery
  - If the diagnosis of torsion is equivocal color Doppler examination of the scrotum can be performed to evaluate blood flow and is performed in a relatively short amount of time
  - Radionuclide scan while being the most accurate modality (90 – 100%) takes a long time to perform putting a patient with torsion at risk of losing the testicle
Testicular Torsion

• Treatment:
  – If the patient can endure it, it is possible that the testicle can be manually “detorsed.”
  – Regardless, the patient will need a surgical procedure to prevent a recurrence.
  – BOTH testicles will need to be surgically fixed to the scrotum (orchiopexy).

Urethral Trauma

• Classified into two anatomical areas:
  – Anterior urethra (includes urethra anterior to the membranous urethra)
    • Causes can include straddle injuries and iatrogenic trauma (catheterization)
    • Urethral strictures typically occur long after initial injury
  – Posterior urethra (includes the membranous and prostatic urethra)
    • Caused by major blunt trauma including motor vehicle accidents and falls
    • Usually associated with pelvic fractures

Right Testicular Torsion Surgery

Anterior Urethra

The urethra is subdivided into the following sections: (1) fossa navicularis; (2) pendulous or penile urethra; (3) bulbous urethra; (4) membranous urethra; (5) prostatic urethra; (6) bladder neck. By common usage, the fossa navicularis, pendulous urethra, and bulbous urethra comprise the anterior urethra, and the membranous urethra, prostatic urethra, and bladder neck comprise the posterior urethra.

Post Surgery

Urethral Trauma

• Frequency:
  – Anterior urethral injury
    • The incidence of anterior urethral injuries are hard to determine as they are not typically diagnosed emergently
    • Most men who are diagnosed with urethral stricture can recall an antecedent event
  – Posterior urethral injury
    • Posterior urethral injuries occur with pelvic fractures and have an incidence of 5 – 10%.
    • Pelvic fractures occur in 20 per 100,000 population annually
**Signs and Symptoms**

- History of pelvic and/or perineal trauma:
  - Blood at the urethral meatus
  - Pelvic pain
  - Urinary retention
  - Distended lower abdomen
  - Peritoneal signs
  - Bruising of the scrotum and/or perineum
  - Hematuria
  - Decrease in force and size of urinary stream
    - Stricture symptoms as above typically occur later (weeks to months) rather than emergently

**Partial Urethral Disruption**

**Laboratory and Imaging**

- Labs for trauma:
  - CBC, CMP, type and cross (hold),
- Plain films and CT scans are often taken if there is suspected pelvic fracture
- US of the bladder can be helpful – look for a “high riding,” distended bladder in the abdomen
- If the patient can produce a urine sample it is a good sign.
  - If blood is at the urethral meatus and the patient cannot produce a sample it is a sign of disruption: partial or complete.
- Retrograde urethrogram can be helpful, but must be done gently. – Look for urethral disruption and extravasation of dye outside the urethra.

**Complete Urethral Disruption with Pelvic Fracture**

**Treatment Goals**

- Treat shock and hemorrhage
- Prevent a partial urethral disruption from becoming a complete disruption
  - Placement of a suprapubic catheter as appropriate
- Treat peritonitis
  - May need surgical repair (usually at a later date)
  - Need broad spectrum antibiotics
- Follow-up straddle injuries for future urethral stricture development

**Acute Urinary Retention**

- An extremely uncomfortable condition characterized by a sudden inability to urinate accompanied by intense suprapubic discomfort.
- Commonly occurs in men with benign prostatic enlargement (BPE/BPH)
- Potential precipitators:
  - ETOH
  - Pseudoephedrine and antihistamine
  - Cold weather
  - Certain urological and/or surgical procedures
  - Anesthesia
Acute Urinary Retention

- Insidious causes of urinary retention:
  - Benign prostatic enlargement
  - Urethral stricture disease
  - Diabetes
  - Urinary tract infection
- Emergent treatment consists of urinary catheterization:
  - One time in and out
  - Foley catheterization until urological evaluation/consultation can be made.

Risk Assessment of Acute Urinary Retention

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Intervention

- Medications can be offered as initial therapy once the acute phase of retention has been relieved:
  - \( \alpha \) blocker:
    - **Generic Name**
      - alfuzosin hydrochloride
      - doxazosin mesylate
      - Silodosin
      - Tamsulosin hydrochloride
      - Terazosin hydrochloride
  - 5-\( \alpha \)-reductase inhibitor:
    - **Generic Name**
      - Finasteride
      - Dutasteride

Acute Prostatitis and Urosepsis

- Prostatitis is a general term used to describe inflammation of the prostate gland by any source:
  - Viral
  - Chemical
  - Bacterial
- Acute prostatitis is most often associated with bacterial infection of the prostate gland and subsequent urosepsis:
  - *E. Coli*
  - *Klebsiella*
  - *Proteus*
  - *Enterobacter species*
  - *Pseudomonas*
  - *Serratia*

Intervention

- Klarskov and colleagues reported that approximately 85% of men experiencing one episode of acute urinary retention elected to undergo surgical intervention
- Though the incidence of subsequent urinary retention is high following the first episode of acute urinary retention it is no longer an absolute indication for surgical intervention in men with BPH.

Epidemiology

- Though rare, acute prostatitis accounts for approximately 5% of office visits per year.
- Acute and chronic prostatitis account for approximately 2 million office visits per year.
- 82% of acute prostate infections involve a single organism.
Signs and Symptoms

- Sudden onset of:
  - Low back and perineal pain
  - Dysuria
  - Shaking chills
  - Fever
  - Suprapubic pain
  - Nausea
  - Vomiting

Work-Up

- Midstream urine collection is most important
  - Will show leukocytes
  - Rarely will show bacteria
  - Can see red blood cells
- Expressed prostatic secretions/post prostate massage urine collection (Should NOT be performed in febrile patients.)
  - Will show leukocytes in clumps
  - Fat laden macrophages
- Appropriately collected urine sample should be sent for culture
- Blood cultures should be obtained if the patient is febrile: 101.5°F or above

Prostate Ultrasound

Treatment

- Hospital admission if the patient has the following:
  - Urinary retention
  - High fever/sepsis
- If hospitalized IV antibiotic should be started:
  - TMPZ 8 – 10 mg/kg/d or
  - Ampicillin with Gentamycin (ampicillin 2 grams divided qid; gentamycin 3 – 5 mg/kg/d divided tid.)
- After the patient is stable (afebrile) for 24 hours appropriate oral antibiotics can be given and IV antibiotics discontinued. Oral antibiotics should be given for 30 days.

Imaging Studies

- Prostate ultrasound and/or pelvic CT scan should be obtained as follows:
  - Very unrevealing as an initial study
  - Should be obtained if there is no improvement after a week’s worth of therapy to examine for prostate abscess – (a complication of acute prostatitis)

Treatment

- Outpatient treatment can be given if the patient is stable at presentation. Any of the following are appropriate:
  - TMPZ 8 – 10 mg/kg/d based on trimethoprim component. DS is usually appropriate.
  - Cipro or Levaquin at 500 mg bid or norfloxacin, ofloxacin, or enoxacin at 400 mg bid.
  - All oral antibiotics should be given for 30 days
- Alpha blocker therapy can be considered in addition to antibiotic treatment. Any of the following are appropriate:
  - Alfuzosin
  - Tamsulosin
  - Terazosin
  - Doxazosin
**Treatment**

- Follow-up is key!

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**Sickle Cell Disease Priapism**

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**Priapism**

- Priapism is the presence of a persistent (4 hours or more), usually painful, erection of the penis unrelated to sexual stimulation or desire. It is a true urologic emergency that may lead to permanent erectile dysfunction and penile necrosis if left untreated.

- Priapism is frequently idiopathic in etiology but is associated with a number of important medical conditions and pharmacologic agents.

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**Priapism Secondary to Spinal Cord Trauma**

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**Epidemiology**

- Overall incidence is 1.5 cases per 100,000 person years.
- Increases to 2.9 cases per 100,000 person years in men over 40 years of age.
- Priapism has been reported in all age ranges, from infancy through old age.
- Priapism in younger patients is more likely to be caused by sickle cell disease whereas in older patients it is more likely to be caused by pharmacologic agents.

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**Types of Priapism**

- Arterial high-flow priapism
  - Priapism secondary to arterial causes also may be significantly less painful than venous priapism.
  - Onset of priapism may be delayed after the acute injury which is typically the cause.
  - The delay may be due to vessel spasm initially or to the formation of a clot that is gradually reabsorbed over a period of days.
  - Priapism secondary to arterial causes usually is less tumescent when compared with venous priapism.

- Veno-occlusive priapism
  - Patients with veno-occlusive priapism present with a painful erection.
  - Erection may be maintained for hours to days.
  - Typically associated with sickle cell disease
Pertinent Questions

- Have you had a history of thromboembolic disease (sickle cell, etc.) or neoplastic disease (leukemia, multiple myeloma)?
- Have you experienced any trauma to the pelvis, genitalia, or perineum?
- Are you using any injectable medication for erectile dysfunction (papaverine, phentolamine, prostaglandin E1)?
- Are you being treated with antipsychotic medication (trazadone, SSRIs, citalopram)?
- Have you used any recreational drugs (cocaine, marijuana, ETOH, ecstasy)?

Laboratory Studies

- Patients with no known predisposing factors:
  - complete blood count (CBC) is appropriate in order to identify the rare case of priapism associated with leukemia.
- Patients with sickle cell disease:
  - CBC and reticulocyte count.
  - If sickle cell status is unknown, a hemoglobin S determination may be useful.
  - Patients with sickle cell disease may also need a type and screen performed in case blood transfusion or plasma exchange is necessary.
- An ABG obtained from the corpus cavernosum is useful in differentiating between high and low flow disease.
  - Values similar to venous blood suggest a low-flow etiology.
- Coagulation profile
- Platelet count
- Urinalysis

More Pertinent Questions

- Have you had any neurological disease (spinal cord lesions, cauda equina compression syndrome)?
- Have you recently had an infection with *Mycoplasma pneumoniae*, or malaria?

Laboratory Studies

- Color flow penile Doppler imaging is currently the study of choice to differentiate high-flow from low-flow priapism.
- In patients with high-flow priapism, selective penile angiography may be required in order to identify the site of the fistula.

Physical Examination

- Presence of priapism should be confirmed by the finding of an erect or semi erect penis. The ventral glans and corpus spongiosum are rarely rigid.
- Carefully examine for evidence of trauma or unreported injection sites to the genital region.
- Examine the patient for evidence of an underlying condition that may predispose to priapism.
- Piesis sign - Perineal compression with thumb in young children causes prompt detumescence in high-flow priapism.

Treatment

- If appropriate treatment is begun early in the course of the priapism most patients respond to conservative measures.
- Prehospital conservative measures:
  - Ice packs to the perineum or penis
  - Asking the patient to walk up stairs (Arterial steal phenomenon)
  - External perineal pressure
- If these measures fail to produce detumescence the patient should proceed to the ED.
Treatment

• Treat underlying disorder
• Oral medications can be tried:
  – Some studies suggest that the use of terbutaline orally, at a dose of 5-10 mg, followed by another 5-10 mg 15 minutes later, if required, produces resolution in about 33% of patients.
  – Oral pseudoephedrine, 60-120 mg orally has also been suggested as a potential therapy due to its alpha-agonist effect. The exact efficacy of this medication orally is unknown.

Paraphimosis

Epidemiology

• Paraphimosis is a rare disorder.
• The incidence is linked to the number of uncircumcised men in the population.
• The trend in the US over the last 30 – 40 years is non circumcision.
  – 1960’s circumcision rates were 78 – 80%
  – 2003 decreased to 50 – 60%

Paraphimosis

• Definition:
  – Paraphimosis occurs only in uncircumcised or partially circumcised males.
  – Paraphimosis is an uncommon condition in which the foreskin, once pulled back behind the glans penis, cannot be brought down to its original position, thus constituting one of the few urologic emergencies encountered in general practice.
  – If left behind the glans the foreskin acts like a tourniquet cutting off blood flow to the glans.
  – Gangrene and/or auto-amputation can occur if there is no intervention

Patient Presentation

• Penile pain – adult
• Obstructive voiding symptoms – adult and pediatric
• Acute urinary outflow obstruction – pediatric
• Penile swelling – especially the glans
Treatment

• All patients with paraphimosis require emergent reduction.
  • Conservative:
    – Manual reduction of the foreskin if possible – patient should be sedated and penis anesthetized
    • Manual reduction
    • Iced glove technique + manual reduction
    • Babcock clamp technique
    • Needle decompression technique
  • Surgical:
    – Dorsal slit procedure
    – Circumcision once swelling subsides to prevent reoccurrence

References and Resources

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Post-Test Outcome Questions

• Which of the following is considered a true urological emergency?
  – Acute hemorrhagic cystitis
  – Phimosis
  – Testicular torsion
  – Varicocele
  • Blood seen at the urethral meatus can indicate urethral disruption.
    – True
    – False
• Which of the following medications can cause acute urinary retention in persons with BPH?
  – Hydrochlorothiazide
  – Pseudoephedrine
  – Tamsulosin
  – Finasteride
  • Priapism is considered a non-traumatic urologic emergency.
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    – False
• Paraphimosis is defined as the inability to retract the foreskin behind the glans penis.
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