Objectives

- Introduction

- Classification of Urological Emergencies - Traumatic vs Non traumatic

- Treatment based on classification
Introduction

- Relatively few urological emergencies compared to other emergent surgical conditions
- Urological Emergencies common with regards to traumatic injury
- Urological Emergencies consist of diagnosis and treatment of conditions relating to the kidney through the external genitalia
Classification

Traumatic

- Renal Trauma
- Ureteral Injury
- Bladder Trauma
- Urethral Injury
- Penile Trauma
- Testicular Trauma

http://www.slideshare.net/UthamalingamKtural/common-urological-emergencies
Classification

Non Traumatic

- Hematuria
- Renal Colic
- Urinary Retention
- Scrotal Emergencies
- Paraphimosis

http://www.slideshare.net/UthamalingamKurukkal/common-urological-emergencies
Renal Trauma

- Renal trauma accounts for approximately 3% of all trauma admissions and as many as 10% of patients who sustain abdominal trauma.
- At most trauma centers, blunt trauma is more common than penetrating trauma, thereby making blunt renal injuries as much as 9 times more common than penetrating injuries.
- The tolerance for nonoperative or expectant management has increased, even in the most seriously injured kidneys, replacing the past tendency toward aggressive renorrhaphy.
- Renal injuries may be generally divided into 3 groups: renal laceration, renal contusion, and renal vascular injury.
Epidemiology

- Penetrating (eg, gunshot wounds, stab wounds)
- Blunt - Rapid deceleration (eg, motor vehicle crash, fall from heights); direct blow to the flank (eg, pedestrian struck, sports injury)
- Iatrogenic (eg, endourologic procedures, extracorporeal shock-wave lithotripsy, renal biopsy, percutaneous renal procedures)
- Intraoperative (eg, diagnostic peritoneal lavage)
- Other (eg, renal transplant rejection, childbirth [may cause spontaneous renal lacerations])

http://emedicine.medscape.com/article/440811-overview#a5
Treatment

- Workup includes Urinalysis and Imaging - US, IVP, CT, Angiography
- Most blunt renal injuries are low-grade; therefore, they are usually amenable to treatment with observation and bed rest alone
- Penetrating trauma is more likely to be associated with more severe renal injury, thus requiring a higher index of clinical awareness
- Further, penetrating trauma is more often associated with other abdominal injuries requiring laparotomy, thus providing the opportunity for intraoperative renal staging and/or repair
- Patients with indications for emergent exploration include those with hemodynamic instability
- Expanding hematomas or active hemorrhage suggests the possibility of high-grade renal injury
- Patients with penetrating trauma who are stable and do not require urgent laparotomy for other possible intra-abdominal injuries may be observed without immediate renal exploration
- Unrelenting gross hematuria may require urgent exploration

http://emedicine.medscape.com/article/440811-overview#a5
Ureteral Injury

- Ureteral injuries due to external trauma are rare.

- The ureter is well-protected in the retroperitoneum by the bony pelvis, psoas muscle, and vertebrae.

- Damage to the ureter usually results from a significant traumatic event that is almost always associated with collateral injury to other abdominal structures.

- Much of the presentation and management of ureteral injuries are dictated by the severity and management of the associated injuries.

http://emedicine.medscape.com/article/440933-overview
Etiology

• While injuries to the ureter can result from external trauma, iatrogenic causes are more common.

• These are usually associated with abdominopelvic surgery or ureteroscopy.

• The ureter is involved in 2.5% of all genitourinary injuries caused by external trauma - either blunt or penetrating trauma.

• The type of external trauma matters; gunshot wounds accounted for 91% of injuries, with stab wounds and blunt trauma accounting for 5% and 4%, respectively.

• Blunt trauma injuries can result from a high-speed motor-vehicle collision, a fall from a significant height, or a direct blow to the region of the L2-3 vertebrae.
Presentation

- The key to managing any ureteral injury, regardless of its etiology, is maintaining a high index of suspicion.

- Findings on a physical examination performed carefully may be revealing, especially in light of the following signs: an abdominal or flank mass, costovertebral angle tenderness, peritoneal signs, or fluid drainage from the wound or vagina.

- In patients with external trauma, ureteral involvement may not be obvious, especially when associated with multiorgan involvement.
Treatment

- Workup includes UA, CT, IVP, MRI, Retrograde/Antegrade ureterography

- The choice of treatment is based on the location, type, extent, and timing of presentation, as well as the patient's medical history, overall condition, and survival prognosis

- Surgery, ureteral stent placement, nephrectomy in severe cases
Bladder Trauma

- Bladder injuries can result from blunt, penetrating, or iatrogenic trauma
- The probability of bladder injury varies according to the degree of bladder distention; a full bladder is more susceptible to injury than is an empty one
- Management varies from conservative approaches that center on maximizing bladder drainage to major surgical procedures aimed at directly repairing the injury
Typical histories in patients with bladder trauma include the following:

- Iatrogenic
- Bladder injury from a motor vehicle collision may occur from direct impact with the car or indirectly from the steering wheel or seatbelt
- Deceleration injuries of the urinary bladder usually result from falling a great distance and landing on unyielding ground
- Assault to the lower abdomen by a sharp kick or blow may result in a bladder perforation
- Penetrating injuries to the bladder usually result from high-velocity gunshots or sharp stab wounds to the suprapubic area
Clinical signs of bladder injury are relatively nonspecific.

Patients often present with the triad of gross hematuria, suprapubic pain or tenderness, and difficulty urinating or inability to void.
Workup

- In the subacute setting, the serum creatinine level can aid in the diagnosis of bladder rupture
- CT scan, Cystography, Operative Exploration

Treatment

- Most extraperitoneal bladder leaks can be effectively managed with maximal bladder drainage per urethral or suprapubic catheter.
- Depending on the presumed size of the bladder defect, the bladder should be drained for 10 to 14 days and then assessed for healing via cystogram.
- Essentially every intraperitoneal bladder rupture requires surgical management.
Urethral Injury

- Trauma to the male urethra must be efficiently diagnosed and effectively treated to prevent serious long-term sequelae.
- Patients with urethral stricture disease secondary to poorly managed traumatic events are likely to have significant voiding problems and recurring need for further interventions.
- Most urethral injuries are associated with well-defined events, including major blunt trauma such as caused by motor vehicle collisions or falls.
- Penetrating injuries in the area of the urethra may also cause urethral trauma.
- Iatrogenic injury to the urethra from traumatic catheter placement, transurethral procedures, or dilation is not uncommon.

http://emedicine.medscape.com/article/451797-overview#a5
Epidemiology

- Posterior urethral injuries are most commonly associated with pelvic fracture, with an incidence of 5%-10%
- Anterior urethral injuries are less commonly diagnosed emergently; thus, the actual incidence is difficult to determine
- Penetrating injury to the urethra is rare, with major trauma centers reporting only a few per year
- Urethral injury should be suspected in the setting of pelvic fracture, traumatic catheterization, straddle injuries, or any penetrating injury near the urethra
Imaging

- The diagnosis of urethral trauma is made by with retrograde urethrography, which must be performed prior to insertion of a urethral catheter to avoid further injury to the urethra.
- Cystoscopy can be performed as adjunct.
- Extravasation of contrast demonstrates the location of the tear.
Treatment

• The traditional intervention for men with posterior urethral injury secondary to pelvic fracture is placement of a suprapubic catheter for bladder drainage and subsequent delayed repair.

• Ultimate repair of the posterior urethral injury can be performed 6-12 weeks after the event, after the pelvic hematoma has resolved and the patient’s orthopedic injuries have stabilized.

• Penetrating anterior urethral injuries should be explored.

• Female urethral injuries are uncommon but deserve special consideration. The mechanism involves shearing of the urethra away from the pubic symphysis by the pelvic fracture and can be associated with significant vaginal and bladder injury.
Penile Trauma

- Traumatic penile injury can be due to multiple factors
- Penile fracture, penile amputation, penetrating penile injuries, and penile soft tissue injuries are considered urologic emergencies and typically require surgical intervention
- The goals of treatment for penile trauma are universal: preservation of penile length, erectile function, and maintenance of the ability to void while standing
Penile Fracture

- Penile fracture is the traumatic rupture of the corpus cavernosum.
- Sudden blunt trauma or abrupt lateral bending of the penis in an erect state can break the markedly thinned and stiff tunica albuginea, resulting in a fractured penis.
- Penile rupture can usually be diagnosed based solely on history and physical examination findings; however, in equivocal cases, diagnostic cavernosography or MRI should be performed.
- Trauma during sexual relations is responsible for approximately one third of all cases; the female-dominant position is most commonly reported.
- Conservative Treatment not recommended.

Penile Trauma cont’d

- Penile amputation is rare, with most cases being reported sporadically. Cases are typically associated with self-mutilation related to acute psychotic episodes or gender dysphoria. Felonious assaults account for the remainder of cases.

- Gunshot wounds account for 35% of all genital injuries. In 25% of cases, the penis alone is involved. In another 25% of cases, both the penis and scrotum are involved.

- Soft tissue skin loss of the penis is a rare phenomenon. Fournier gangrene accounts for approximately 75% of cases that involve genital skin loss.
Treatment

- The medical management of penile trauma is limited and usually depends on surgical optimization of the patient in preparation for the operating room.

- Penile trauma is often accompanied by other associated injuries, some of which may be life-threatening.

- Fluid resuscitation and stabilization of the patient should be the focus.

- Surgical Repair
Testicular Trauma

- Despite the vulnerable position of the testicles, testicular trauma is relatively uncommon.

- Given the importance of preserving fertility, traumatic injuries of the testicle deserve careful attention.

- Testicular injuries can be divided into three broad categories based on the mechanism of injury: (1) blunt trauma, (2) penetrating trauma, and (3) degloving trauma.

- Workup - UA/US

- Patients with a history of blunt trauma and associated hematoceles often undergo surgical exploration for earlier resolution of pain and shorter convalescence.

- Conservative Therapy vs Surgical Intervention (Documented testicular injuries command immediate repair).

http://emedicine.medscape.com/article/441662-overview
Hematuria

- Hematuria is a sign and not itself a disease; thus, therapy should be directed at the process causing it.

- Asymptomatic (isolated) hematuria generally does not require treatment.

- In conditions associated with abnormal clinical, laboratory, or imaging studies, treatment may be necessary, as appropriate, with the primary diagnosis.

- Surgical intervention may be necessary with certain anatomic abnormalities (e.g., ureteropelvic junction obstruction, tumor, or significant urolithiasis).

- Dietary modification is usually not indicated, except for children who may tend to develop hypertension or edema as a result of the primary disease process (e.g., nephritis).

- Patients with persistent microscopic hematuria should be monitored every 6-12 months for the appearance of signs or symptoms indicative of progressive renal disease.
<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Clinical History</th>
<th>Clinical Findings</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Renal Etiology</td>
<td>• Comorbid diseases including hypertension, diabetes, and lupus</td>
<td>• Proteinuria • Elevated creatinine • Anemia due to erythropoietin deficiency</td>
<td>• See Renal chapter</td>
</tr>
<tr>
<td>Malignancy</td>
<td>• Painless hematuria</td>
<td>• Positive urine cytology for high grade malignancies (specific, but not sensitive)</td>
<td>• Renal cell carcinoma • Transitional cell/bladder carcinoma • Prostate cancer • Urethral cancer</td>
</tr>
<tr>
<td>Infection</td>
<td>• Increased urinary frequency • Urinary urgency</td>
<td>• Pyuria and bacteria on urinalysis • Bacterial growth in urine culture</td>
<td>• Cystitis • Pyelonephritis • Tuberculosis (pyuria with negative urine culture)</td>
</tr>
<tr>
<td>Stones</td>
<td>• Colicky flank pain</td>
<td>• Patients very uncomfortable</td>
<td>• If history of stones, work-up for stone forming state</td>
</tr>
<tr>
<td>Benign Prostatic Hyperplasia</td>
<td>• Hematuria occurs towards the end of the urinary stream</td>
<td>• Enlarged prostate on rectal examination</td>
<td>• See dedicated BPH section</td>
</tr>
<tr>
<td>Urethral atrophy</td>
<td>• Post-menopausal women</td>
<td>• Hematuria on initiation of urinary stream (anterior urethral bleeding)</td>
<td>• Occurs in up to 13% of post-menopausal women</td>
</tr>
<tr>
<td>Trauma</td>
<td>• Recent surgery, trauma to the pelvis or abdomen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idiopathic</td>
<td>• No suggestive causes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-hematuria causes of red-tinged urine or positive dip-stick</td>
<td>• Beet ingestion • Porphyria • Myoglobinuria or hemoglobinuria</td>
<td>• Recent strenuous exercise or prolonged immobility • Elevated serum CPK</td>
<td>• Supernatant of spun urine red colored</td>
</tr>
</tbody>
</table>
Renal Colic

- The classic presentation for a patient with acute renal colic is the sudden onset of severe pain originating in the flank and radiating inferiorly and anteriorly; at least 50% of patients will also have nausea and vomiting.

- Patients with urinary calculi may report pain, infection, or hematuria.

- Patients with small, nonobstructing stones or those with staghorn calculi may be asymptomatic or experience moderate and easily controlled symptoms.
Diagnosis

- Dramatic costovertebral angle tenderness; pain can move to upper/lower abdominal quadrant with migration of ureteral stone
- Generally unremarkable abdominal evaluation: Possibly hypoactive bowel sounds; usually absence of peritoneal signs; possibly painful testicles but normal-appearing
- Constant body positional movements (eg, writhing, pacing)
- Tachycardia
- Hypertension
- Microscopic hematuria
- labs/imaging
Treatment - Conservative

- IV hydration
- Nonnarcotic analgesics (eg, APAP)
- PO/IV narcotic analgesics (eg, codeine, butorphanol, morphine sulfate, oxycodone/APAP, hydrocodone/APAP, meperidine, nalbuphine)
- NSAIDS (eg, ketorolac, ketorolac intranasal, ibuprofen)
- Uricosuric agents (eg, allopurinol)
- Antiemetics (eg, metoclopramide)
- Antidiuretics (eg, DDAVP)
- Antibiotics (eg, ampicillin, gentamicin, ticarcillin/clavulanic acid, ciprofloxacin, levofloxacin, ofloxacin)
- Alkalinating agents (eg, potassium citrate, sodium bicarbonate): For uric acid and cysteine calculi
- Corticosteroids (eg, prednisone, prednisolone)
- Calcium channel blockers (eg, nifedipine)
- Alpha blockers (eg, tamsulosin, terazosin)
Surgical Treatment - Stones > 7mm

- Stent placement
- Percutaneous nephrostomy
- Extracorporeal shockwave lithotripsy (ESWL)
- Ureteroscopy
- Percutaneous nephrostolithotomy
- Open nephrostomy
- Anatrophic nephrolithotomy
Urinary Retention

- Urinary retention/obstruction is a blockage of the flow of urine out of the body.
- It is a common cause of acute and chronic renal failure and may result from a wide variety of pathologic processes, intrinsic and extrinsic to the urinary system.
- Symptoms and signs of obstruction are often mild, occurring over long periods of time and requiring a high index of suspicion for diagnosis.
- Early recognition and treatment are the keys to preventing renal loss.

Signs/Symptoms

- Pain (most common symptom in acute obstruction but typically absent with slowly obstructing conditions)
- Altered patterns of micturition
- Acute and chronic renal failure
- Gross or microscopic hematuria
- Recurrent urinary tract infection (UTI)
- New-onset or poorly controlled hypertension secondary to obstruction and increased renin-angiotensin
Diagnosis & Treatment

- Imaging, serum labs, UA

- Prior to addressing the specific therapy for obstruction, the ED physician must investigate and begin treatment of the life-threatening complications of obstructive uropathy (eg, pulmonary edema, hypovolemia, urosepsis, hyperkalemia)

- The overriding goal in the treatment of urinary obstruction is the reestablishment of urinary flow

- Hypotension after bladder decompression is thought to be due to a vagolytic response from a rapid change in bladder-wall tension

Scrotal Emergencies

- Most common scrotal emergencies are testicular torsion and acute epididymitis.

- Testicular torsion is a true urologic emergency and must be differentiated from other complaints of testicular pain because a delay in diagnosis and management can lead to loss of the testicle.
Testicular Torsion

- Although testicular torsion can occur at any age, including the prenatal and perinatal periods, it most commonly occurs in adolescent males; it is the most frequent cause of testicle loss in that population.

- S/S: Pain duration of less than 24 hours, Nausea or vomiting, High position of the testicle, Transverse lie of the affected testis, Abnormal cremasteric reflex.

- If the diagnosis of torsion is suspected on clinical grounds, early urologic consultation is mandatory since definitive treatment is surgery for detorsion and orchiopexy or possible orchiectomy.

- Treatment: Manual Detorsion and Surgery
Acute Epididymitis

- Patients with testicular or scrotal pain require immediate evaluation in order to identify and quickly treat potential cases of testicular torsion.

- Acute epididymitis is treated with antibiotic therapy, analgesics for pain control, and supportive care, which includes scrotal elevation and support, application of an ice pack, and, in some cases, spermatic cord block.

Table 3. Empirical Antibiotic Therapy

<table>
<thead>
<tr>
<th>Suspected Pathogens</th>
<th>Risk Factors</th>
<th>Treatment</th>
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<tbody>
<tr>
<td>Neisseria gonorrhoeae</td>
<td>&lt;35 years of age, Sexually active</td>
<td>Ceftriaxone 250 mg IM single dose PLUS</td>
</tr>
<tr>
<td>Chlamydia trachomatis</td>
<td></td>
<td>Doxycycline 100 mg po bid × 10 days</td>
</tr>
<tr>
<td>Enteric organisms</td>
<td>&gt;35 years of age, Benign prostatic hyperplasia, Urinary tract instrumentation</td>
<td>Levofloxacin 500 mg po daily × 10 days OR</td>
</tr>
<tr>
<td>(e.g., Escherichia coli)</td>
<td></td>
<td>Ofloxacin 300 mg po bid × 10 days</td>
</tr>
<tr>
<td>N. gonorrhoeae</td>
<td>Sexual anal intercourse</td>
<td>Ceftriaxone 250 mg IM single dose PLUS</td>
</tr>
<tr>
<td>C. trachomatis</td>
<td></td>
<td>Levofloxacin 500 mg po daily × 10 days OR</td>
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<td>(e.g., E. coli)</td>
<td></td>
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</tbody>
</table>

* Dosing provided for those with normal renal function.  
Source: Reference 2.
Paraphimosis

- Paraphimosis is a urologic emergency in which the retracted foreskin of an uncircumcised male cannot be returned to its normal anatomic position.
- It is important for clinicians to recognize this condition promptly, as it can result in gangrene and amputation of the glans penis.
- Prompt urologic intervention is indicated.

Summary

- Introduction
- Classification of Urological Emergencies - Traumatic vs Non traumatic
- Treatment based on classification