UROLOGIC TRAUMA

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UROLOGIC TRAUMA

- Renal trauma
- Ureteral injury
- Bladder injury
- Urethral injury
- Injury to external genitalia
RENAL TRAUMA

- Most common type of urinary trauma
- **Etiology:**
  - 80-90% → blunt trauma (falls from height, motor vehicle)
  - 10 - 20% → penetrating trauma (gunshot & stab wound)
- children (< 1 yrs) more prone to renal injury due to relative large size of kidney, scant perirenal fat, underdeveloped Gerota’s fascia
RENAL TRAUMA

- Majority cases are grade 1
  - Such heal spontaneously without adverse sequelae and require no imaging or active treatment
- MUST be suspected if
  - Significant flank ecchymosis / hematuria
  - Lower (T8-12) rib fractures
  - Sudden deceleration / Fall from height
  - Penetrating abdominal or flank injury
- Hematuria: degree of hematuria does not correlate with the severity of the trauma
Renal trauma:
Clinical findings

- **Symptoms**: evidence of abdominal trauma, pain, hematuria
- **Signs**: shocks, ecchymosis
- **Lab findings**: microscopis or gross hematuria
Renal trauma: Classification of Injury

- 5 Classes of Renal Injury:

Organ Injury Scaling
Committee

Renal Trauma

- Grade 1,2 : minor trauma
- Grade 3,4,5 : major trauma
Grade I

- Contusion
  - Hematuria (micro or gross)
  - Urologic studies

- Hematoma
  - Subcapsular
  - Non expanding
  - Parenchyma

Grade II

- Hematoma
  - Perirenal
  - Nonexpanding

- Laceration
  - < 1.0 cm
  - Renal cortex only
  - No urinary extravasation
Grade III

- Laceration
  - > 1.0 cm
  - Renal cortex only
  - No urinary extravasation
  - Intact collecting system
Grade IV

- **Laceration**
  - Renal cortex
  - Renal medulla
  - Collecting system

- **Vascular**
  - Main renal artery/vein injury with contained hemorrhage.
Grade V

- Completely shattered kidney.
- Avulsion of renal hilum (pedicule) which devascularizes kidney.

Renal trauma:

Complication

- Dependent on the grade and the method of management
- Usually occur within 1 mo of injury
- Early complication:
  - prolonged urinary extravasation
  - urinoma
  - shock from massive blood loss
  - renal infarction
  - abscess formation
Renal trauma:

Complication

- **Late** complication:
  - delayed bleeding, av fistulas, abscess, urinary fistula, hydronephrosis
  - renal vascular hypertension
  - perinephric fibrosis
  - 3 - 6 mo later → IVU or CT to evaluate delayed hydronephrosis or renal atrophy
Renal trauma: Management

- Prompt treatment of shock and hemorrhage, complete resuscitation and evaluation of associated injuries
- Surgical methods of renal exploration & reconstruction
- Non operative & conservative properly staged and selected renal injuries can be successfully managed conservatively
Renal trauma:

Management

- Strict bed rest until the urine visibly clears
- Close monitoring of vital signs
- Hematocrit, blood drawn every 6 hours until stable
- Broad-spectrum AB
- Transfusion
URETERAL INJURY

- Mechanism:
  1. External trauma: penetrating trauma (rare) high velocity missiles
  2. Surgical trauma
URETERAL INJURY:  
Sign & symptom

- Symptoms: fever, flank and lower quadrant pain, if bilateral → anuria
- Signs: acute hydronephrosis, sign & symptoms of acute peritonitis may be (+)
- Imaging: IVU, RPG, CT
BLADDER TRAUMA

- 86% due to blunt abdominal trauma
- 90% assoc with pelvic fx
- 60% extraperitoneal, 30% intraperitoneal
  - 10 - 12% combined injuries
- Mechanism of injury:
  - intraperitoneal
  - extraperitoneal
BLADDER TRAUMA:

Sign & symptom

- Hematuria is the hallmark
- Bladder dome = weakest point
- Pelvic or lower abdominal pain
- Inability to urinate

Imaging:
- cystography
- CT cystography
Extraperitoneal Bladder Rupture:
Intraperitoneal: Dome is weakest
BLADDER TRAUMA: Management

- Extraperitoneal – foley drainage X 14 days, Antibiotics, let it seal.
  - Intraperitoneal urine is an irritant.
  - Ileus, sepsis, peritonitis.
URETHRAL TRAUMA

- Relatively uncommon
- Divided into anterior & posterior injuries
- Vast majority are due to blunt trauma
- Posterior injuries are due to pelvic fx
- Anterior injuries are due to straddle type inj
- The management goal is to minimize the chances for debilitating complications of incontinence, impotence & stricture
Urethral Trauma

- According to location
- Anterior urethra:
  - bulbous & pendulous
- Posterior urethra:
  - membrano-prostatic
Posterior urethral injuries

- 73% is complete, 27% partial
- Rare in women
- Mechanism: pelvic fracture
- Triad:
  - “Blood at the meatus”
  - Inability to urinate
  - Full bladder
Posterior urethral injuries: signs & symptoms

- Blood at meatus
- Gross hematuria
- Perineal ecchymosis or hematoma (GU diaphragm is disrupted)
- Scrotal or penile hematoma
- Difficulty passing a foley cath
- Distended bladder and inability to void
- Non palpable prostate
- Classical triad
Posterior Urethral rupture

*From McAnich JW. In Tanagho EA, McAninch JW, editors: Smith’s general urology, ed 14, Norwalk, Conn, 1995, Appleton & Lange.*
Posterior Urethral Injury

Diagnosis

- Retrograde urethrogram:
Retrograde Urethrogram: Interpretation

- Contrast extravasation + Contrast in bladder
  - PARTIAL Tear

- Contrast extravasation only
  - COMPLETE Tear
Partial Tear
Complete Tear
Posterior Urethral Injury: Management

- "Do not attempt to pass a catheter"
  - Unstable patient: suprapubic tube
  - Stable patient: early or late endoscopic realignment
    - Simultaneous cystoscopy and urethroscopy
    - "Cut to the light"
  - Open repair
- Complications: ED, incontinence
Posterior Urethral Injury Management

- **Partial tear**
  - careful passage of 12-14 Fr. Foley.
  - If any resistance → Urology

- **Complete tear:**
  - Urology + suprapubic cath.

- **If Foley already there and suspect tear:**
  - LEAVE FOLEY IN PLACE
  - Small tube alongside the foley
  - Angiocath 16-gauge
  - Modified urethrogram
Anterior Urethral Injury
Blunt trauma

- Caused by direct injury to the penis & urethra
- More common than posterior
- If Buck’s fascia intact → blood & urine remain within the penis → ‘sleeve hematoma’
- If Buck’s fascia disrupted → blood & urine can spread to the scrotum, abdominal wall, perineum and thigh
- Extravasation into the perineum → ‘butterfly sign’
Sleeve Hematoma
Butterfly Hematoma
Anterior Urethral Injury:

**Signs & symptoms**

- History of direct perineal trauma / straddle injury
- Blood at meatus (the most important predictor)
- Perineal and/or scrotal swelling & ecchymosis or tenderness
- Penile hematoma
- Inability to void

*NO Foley if injury suspected*
Anterior Urethral Injury: Classification & Management

- **Contusions**
  - if pat can void easily and the urine relatively clear → no Foley or additional treatment

- **Lacerations**
  - incomplete → proximal urinary diversion by suprapubic tube (14 - 21 days)
  - complete → high stricture rate → delayed open surgical repair
Anterior Urethral Injury

Penetrating trauma

- Amount of contrast extravasation on RUG does not correlate with severity of injury
- RUG should be performed for:
  - all penetrating wounds to the penis or perineum
  - blood at the penile meatus
  - gross hematuria
  - a suspected renal injury
Anterior Urethral Injury

Penetrating trauma

Management:
- primary repair for stab wounds & GSW
- stricture rates 80% for urinary diversion and stenting vs 10 - 12% for primary repair
- surgical manage is conservative debridement & primary end-to-end anastomosis
EXTERNAL GENITALIA

- Penetrating, blunt, burns and industrial accidents
- Extensive injuries often complex problems of diagnosis, management and reconstruction
EXTERNAL GENITALIA

Scrotal injuries

- All penetrating scrotal GSW demand prompt surgical exploration.
- The goal is testis preservation to maintain androgen production and cosmesis. Fertility is not commonly preserved.
EXTERNAL GENITALIA

Penile fracture

- Most common cause: direct blow to erect penis during intercourse or masturbation
- Fx is a tear in the tunica albuginea. Erection → thins out the tunica → more susceptible to injury
- Signs & Symptoms: a ‘cracking or popping’ sound, immediate pain, rapid detumessence, penile swelling, penile deviation
EXTERNAL GENITALIA

Testis rupture

- The most common cause: motor cycle and auto accident, sporting activities

- Signs & symptoms:
  - painful on palpation
  - nausea & vomitus
  - scrotal swelling & ecchymosis

- Management:
  - tunica intact → conservatively
  - early exploration offers pat his best chance for testis salvage
EXTERNAL GENITALIA

Penile fracture

- Location: palpable defect in the tunica, focal tenderness, or overlying hematoma with contralateral penile deflection
- Management: prompt exploration and primary repair of the tunica albuginea with absorbable suture
- Conservative management → penile fibrosis & by pain and angulation with erection
EXTERNAL GENITALIA

Penile amputation

- Usually an act of self-emasculcation by an acutely psychosis and young patient

- Management:
  - the amputated penis → cleaned of blood & debris → cooled to 4 °C
  - successful replantation of the penis depend on limiting warm ischemic time

- Goal: cosmetic & functional

- Complications: necrosis, penile numbness, poor sensation, stricture
EXTERNAL GENITALIA

Testis amputation

- Self-castration
- Upper limit time for replantation < 4-6 hours
- Technically demanding and time consuming microvascular surgery
the end