

Urological emergencies and trauma

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Trauma first steps

- A : airway evaluation . Removal of foreign body and clot
- B : evaluation of effective breathing and ventilation
- C : evaluation of circulation and primary bleeding control
- D : drug (if needed)
- The urinary system has natural protection to trauma because of special anatomical situation .(psoas and quadratus lumborum muscles and lower ribs at posterior aspect , abdominal wall and organs at front)

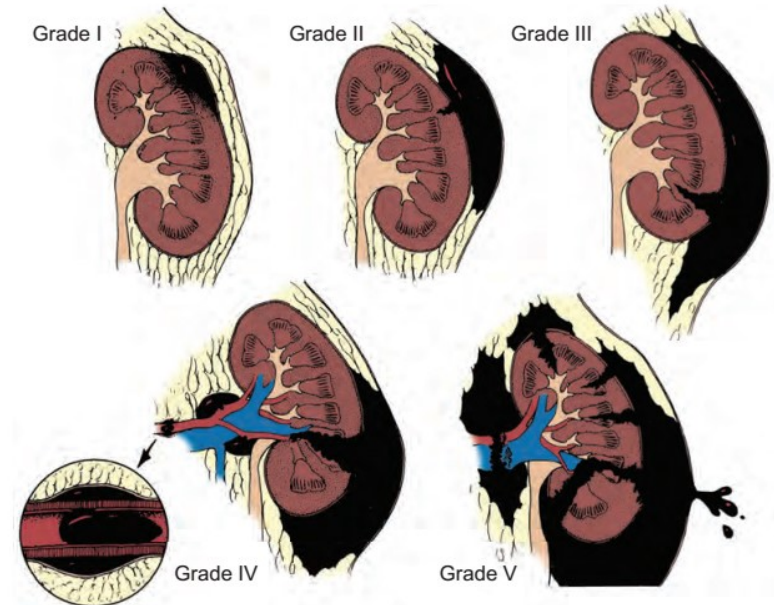
- Kidney trauma :
- May blunt or penetrated . The best indicators of significant urinary system injury include gross and microscopic hematuria (>5 red blood cells/high-power field [RBCs/HPF]).
- Indirect trauma : deceleration trauma
- Kidney trauma clues :
- 1- lower ribs(11 &12) fracture
- 2- lower thoracic and lumbar vertebral fracture
- 3- laceration and hematoma of flank
- 4- penetrating trauma at flank or other anatomical relative area
- 5- gunshot trauma
- 6- decelerative trauma

Indications for Renal Imaging :(abd pel spiral ct with contrast)

1. All penetrating trauma with a likelihood of renal injury
2. All blunt trauma with significant acceleration/deceleration mechanism of injury, specifically rapid deceleration as would occur in a high-speed motor vehicle accident or a fall from heights.
3. All blunt trauma with gross hematuria
4. All blunt trauma with microhematuria and hypotension (defined as a systolic pressure of less than 90 mm Hg at any time during evaluation and resuscitation).
5. All pediatric patients with greater than 5 RBCs/HPF

TABLE 50-1 American Association for the Surgery of Trauma Organ Injury Severity Scale for the Kidney

GRADE*	TYPE	DESCRIPTION
I	Contusion	Microscopic or gross hematuria, urologic studies normal
	Hematoma	Subcapsular, nonexpanding without parenchymal laceration
II	Hematoma	Nonexpanding perirenal hematoma confined to renal retroperitoneum
	Laceration	<1 cm parenchymal depth of renal cortex without urinary extravasation
III	Laceration	>1 cm parenchymal depth of renal cortex without collecting system rupture or urinary extravasation
IV	Laceration	Parenchymal laceration extending through renal cortex, medulla, and collecting system
	Vascular	Main renal artery or vein injury with contained hemorrhage
V	Laceration	Completely shattered kidney
	Vascular	Avulsion of renal hilum, devascularizing the kidney



- Management of upper urinary tract trauma :
- Surgical exploration is indicated for
 - 1- urine extravasation with >20% necrosis
 - 2- penetrated trauma grade >2
 - 3- unstable hemodynamic
 - 4- pulsatile or expanding retroperitoneal hematoma
 - 5- main aenal artery trauma(if diagnosed after < 8 hrs at trauma)
- For other cases conservative management is advised . Patient should be CBR until clearance of urine. Vital sign closed monitoring and serial HCT measurement .
- Sonography weekly for 1 month
- Control ct after 3 weeks .

- Renal trauma complication :
- 1- urine leakage and urinoma that should be drained (percutaneous or stent)
- 2- delayed bleeding (at day 7-21) hydration and CBR -
→angioembolization-→surgery
- 3- abscess formation : fever ,pain .illnrss and ileus. At day 5-7
- 4- HTN(page kidney)
- 5- AV shant .

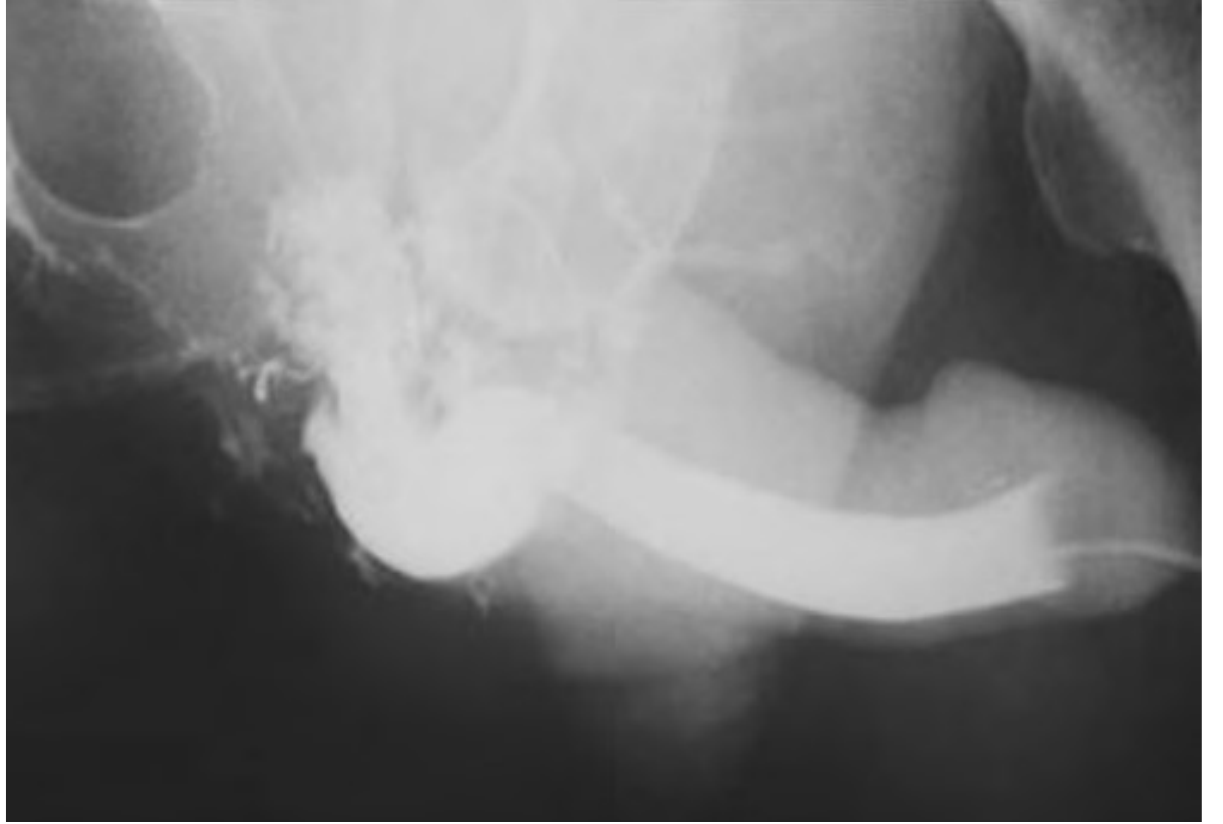
- **Ureteral trauma :**
- **External trauma :** gunshot is more prevalent .
- Thoracolumbar vertebral fx is clue of ureteral blunt trauma.
- UP avulsion : descelerative trauma . (no hematuria) . IVU is advised for detection of UP avulsion .
- **Iatrogenic trauma :** gynecologic surgery(abdominal hysterectomy)>urologic surgery(ureteroscopy)>general surgery
- **Diagnosis :** ct scan :extravasation . IVU and RPG .
- **Treatment :** dj insertion if transection $<1/2$. Other cases : surgical repair (ureteropelvic or ureteroureteral anastomosis , ureteral reimplantation , boari flap , psoas hitch and transureteroureterostomy)

- Bladder trauma :
- The urinary bladder is generally protected from external trauma because of its deep location in the bony pelvis .
- Bladder injuries that occur with blunt external trauma are rarely isolated injuries—80% to 94% of patients have significant associated nonurologic injuries .
- Bladder injury : 1- extraperitoneal : A dense, flame-shaped collection of contrast material in the pelvis is characteristic of extraperitoneal extravasation 2- intraperitoneal
- CLINICAL INDICATORS OF BLADDER INJURY :
- Suprapubic pain or tenderness
- Free intraperitoneal fluid on CT or ultrasound examination
- Inability to void or low urine output
- Clots in urine or clots noted in bladder on CT
- Enlarged scrotum with ecchymosis
- Abdominal distention or ileus

- **Diagnosis** : retrograde cystography .
- **Treatment** : 1- intraperitoneal : surgical exploration . 2- extra : usually only catheterization is sufficient . Indications of surgery : clot retention, open pelvic fx , rectal injury, bone fragment in bladder .



- **URETHRAL INJURIES :**
- **Anterior urethral injury :** is rare .
- **Posterior Urethral Injuries :** is more frequent .
- Urethral disruption injuries typically occur in Straddle fractures .
- Urethral disruption is heralded by the **triad** of blood at the meatus, inability to urinate, and palpably full bladder .
- **Urethrography:** When blood at the urethral meatus is discovered, an immediate retrograde urethrogram should be performed to rule out urethral injury .
- **Urethral catheterization :** urologist can gently pass the 12f foley.
- **Treatment :** if foley could be passed , maintain for 3 weeks
if not : cystostomy and delayed repair after 3 month



- **Penile injury :**
- **Penile complete distraction :** usually is self induced . Penile reconstruction should done at 6- 16 hrs based on ischemia type (cold or not) .
- **Penile fracture :** is result of bending pressure to erected penis . Bucks fascia tearing result in click sound and immediate detumescence and hematoma and deviation of penis .
- Surgical repair of interrupted tunica should done as soon .
- Complications : ED and chordee .

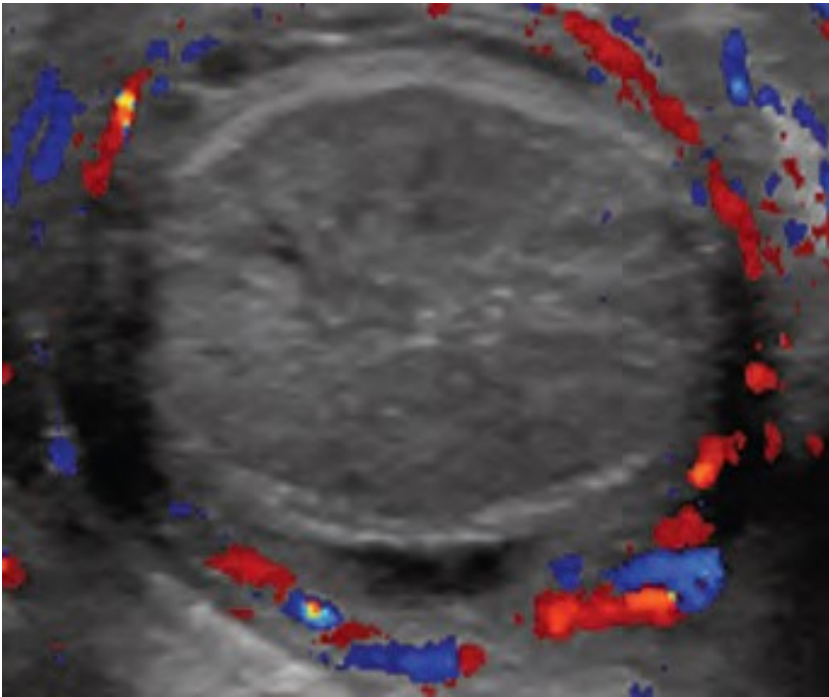
- **Testicular injury :**
- Blunt trauma is more prevalent .
- **Indications of surgical exp&repair:**
- 1- tunica albuginea tearing
- 2- intratesticular huge hematoma
- 3- huge hematocele
- **Diagnosis :** examination and sonography

Acute scrotum

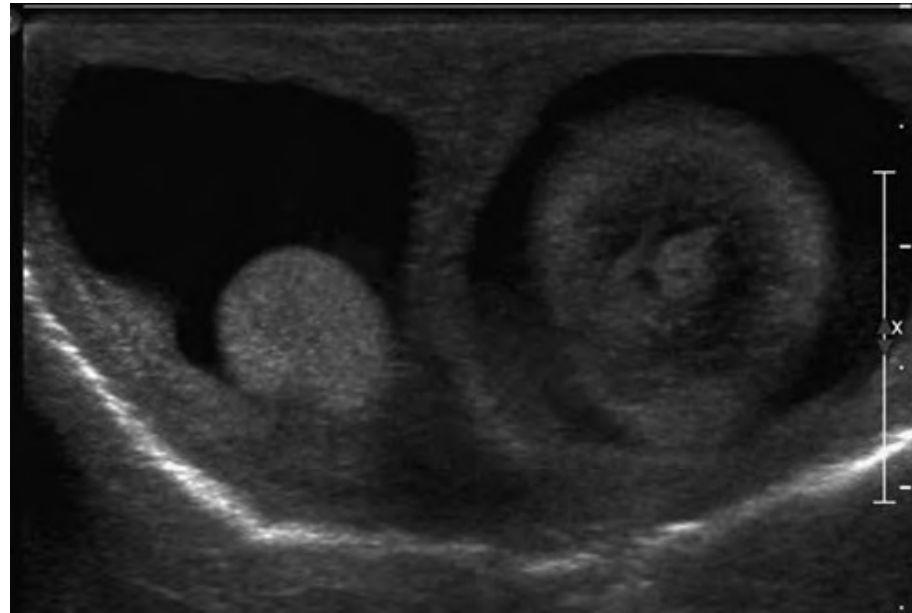
- Acute scrotum refers to the constellation of new onset of pain, swelling, and/or tenderness of intrascrotal contents.
- **DD** : 1- testicular torsion 2- appendicular torsion 3- infections 4- hernia and hydrocele 5- trauma 6- vasculitis
- **Spermatic Cord Torsion** :
- Acute **Intravaginal** Spermatic Cord Torsion : Predisposing Factors. Intravaginal torsion is commonly attributed to excess mobility of the testis within a “bell-clapper deformity” .
- the prevalence of torsion is much lower: 8.6 per 100,000 males aged 10 to 19 per year .
- There is evidence for a familial predisposition.

- Cryptorchid testes are at increased risk of torsion and difficult to assess .
- **Clinical Presentation:** Intravaginal testicular torsion may occur at any age, but the vast majority of cases occur after age 10 years with a peak at 12 to 16 years .
- Classically, boys complain of acute, severe scrotal pain that occurs at rest (even sleep), or with physical activity or after trauma.
- Nausea and vomiting occur in 10% to 60% of boys .
- Scrotal edema and erythema may be present, depending on the duration or degree of torsion.
- Dysuria and fever are uncommon.
- The most common physical findings are generalized testicular tenderness, abnormal orientation of the testis (high-riding testis and horizontally oriented), and absent cremasteric reflex.

- Diagnosis : Doppler ultrasonography and radionuclide scan .
- Treatment : emergent surgery . (<4hr). Irreversible injury >8hrs.



- **Extravaginal Spermatic Cord Torsion :**
- Perinatal spermatic cord torsion is a term applied to infants regardless of whether the event occurred prenatally (hours, days, weeks, months), during delivery, or postpartum.



Priapism

- Priapism, a prolonged penile erection sustained for longer than 4 hours with the absence of both physical and psychological stimulation, is commonly painful.
- Priapism can be categorized into three types:
 - 1. **Ischemic** (veno-occlusive, low-flow) priapism is characterized by little or **no cavernous blood flow**, and cavernous blood gases are **hypoxic**, hypercapnic, and acidotic. The corpora are rigid and **tender** to palpation.
 - 2. **Nonischemic** (arterial, high-flow) priapism is caused by unregulated cavernous arterial inflow. Typically, the **penis is neither fully rigid nor painful**. There is often a history of antecedent trauma resulting in a cavernous artery or corpora cavernosa fistula.
 - 3. **Stuttering** (intermittent) priapism is a recurrent form of ischemic priapism with painful erections with intervening periods of detumescence.

- **Etiology :**

- 1-homozygous sickle cell disease . Usually frequently occur.
- 2- intracavernousal injection of papaverin
- 3- neurologic disease : sci , disk herniation , ..
- 4- malignancies : leukemia, melanoma . Prostate and renal cancer
- 5- drugs : (alfa blockers and serotonin release)trazodone , antipsychotics , hydralazine , prazosin , ..
- 6- TPN : fat embolism and venous occlusion
- 7- trauma

- **Diagnosis** : based on history and examination . CBG and sonography and angiography .
- **Treatment** (shoule initiate befor 24 hrs) :
- **Medical** : is first step . Irrigation of cavernous and intracavernousal injection of alfamimetics (phenylephrine 250-500 microgram) + Hydration and oxygenation .
- **Surgery** : transglanular shant and angioembolization