Emergency in Urology

- Doctor Note
- 430 Team note
- IMP

431 SURGERY TEAM

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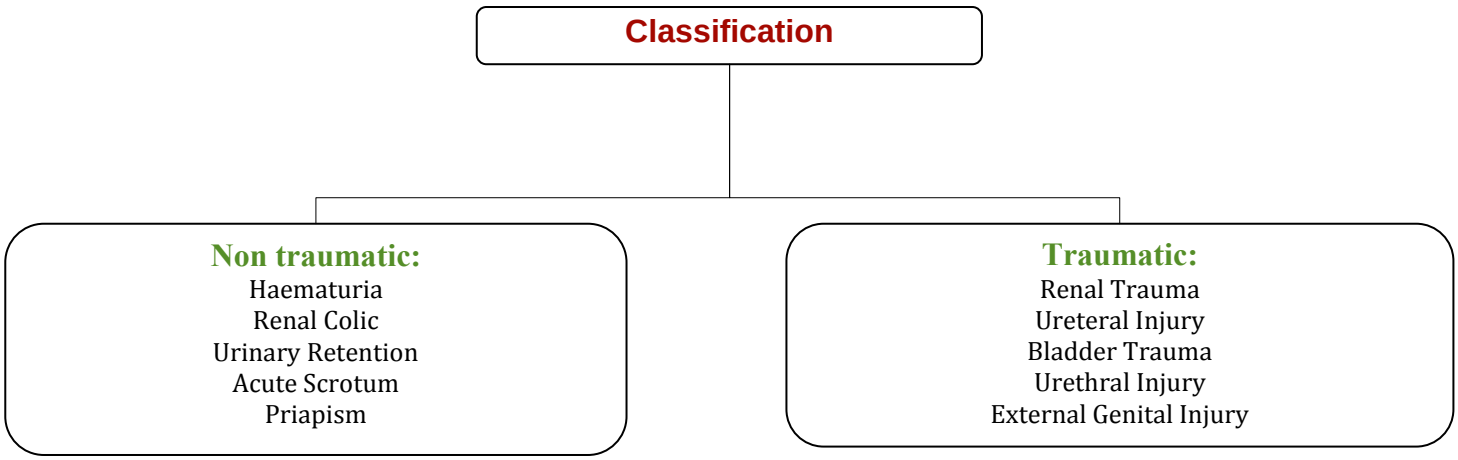
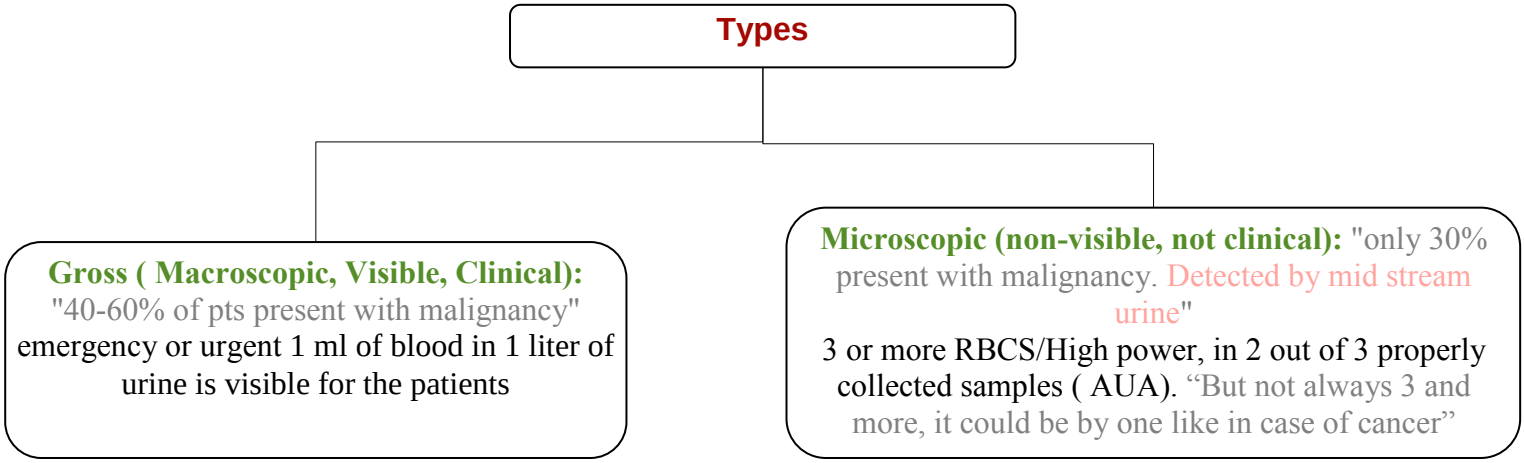
Emergency in Urology:

Compared to other surgical fields there are relatively few Urological Emergencies.



Non-Traumatic Urological Emergencies:

1- Haematuria (Blood in the urine):



Causes: "of emergency gross haematuria"

Varies according to:

- Patient Age "common cause of haematuria are in adolescent not children"
- Symptomatic "pain >> Stones, UTI, Trauma & lastly cancer" or Asymptomatic "1st cancer".
- The existence of risk factors for malignancy smoking is very IMP number 1 risk factor for malignancy (transitional cell tumor of renal pelvis ureter and Bladder). Transitional cell tumor also in pt painting like painting cars. Bilharzias for squamous cell carcinoma"
- The type: Gross or Microscopic

Could be:

- **Pre Renal**: Systemic problems such as: SLE, hematology disease, drugs like anticoagulant, liver disease or failure.
- **Renal**: tumor either benign or malignant (painless), stone (painful), TB, arteriovinous malformation, glomerulonephritis, renal stasis.
- **Post-renal:** tumor in ureter, prostate, bladder, urethra or Bilharzias

History of Haematuria: "very IMP, help you in the diagnosis"

- Age.
- Residency. "Bilharzias in jeizan"
- Duration.
- Occupation.
- Painless "tumor" or painful "stone or UTI"
- Timing of haematuria.
- How dark colored is the urine? "Bright red means low bleeding, dark high"
- Clots and shape of clots "Clots means severe bleeding. Shape help you in determine the site, it is rounded (mostly distal track, bladder and up) or sausage-like (ureter)"
- **Trauma**
- Bleeding from other sites "hematological or systemic cause"
- Associated Symptoms urinary and Systemic "other problems in urinary system"
- History of: bleeding disorders, SC, TB, Bilharzias & stone disease, hemophilia
- Family History o:f Malignancy "like prostate cancer" or hematological disorders "specially for young pt".
- Drugs. "like anticoagulant cause haematuria. red or orange discoloration caused by some drugs like Rifampicin for TB, Or the pt ate something"
- Colored food or drinks intake.
- **Smoking** "Very IMP to ask, if the pt is smoking, mostly it is cancer"

Management:

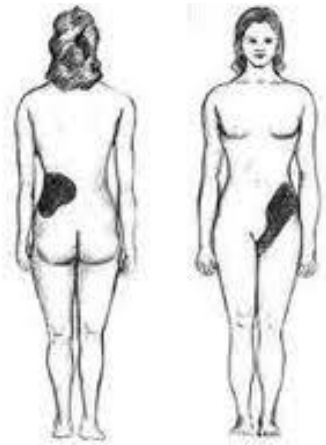
- Gross Haematuria mandate full work up.

Work Up: " if it mild just some discolorations not that heavy, you don't need to do a lot just do some investigations. But if it severe with some clots or fear from clots, better to insert Foley catheter and wash the bladder because washing the bladder decrease it. Plus if you did not wash the bladder, the pt might have clots retention"

- History
- P/E= usually no much signs "usually, you won't find a lot of signs, except in some cases like sickle cell disease. That is why they call it the disease of investigations "
- Investigations. "most IMP imaging method is CTU (computer tomograghy urograpgy"
- 3 ways urethral catheter and bladder wash out for heavy bleeding.
- Treat according to the cause.

2- Renal Colic:

- The commonest urologic emergency. "always in ER, you will find pts with renal colic specially in Saudi Arabia very common"
- One of the commonest causes of the "Acute Abdomen".



Pain:

- sudden onset
- colicky in nature
- Radiates
- May change in location, from the flank to the groin,"the location of the pain does not provide a good indication of the position of the stone"

Kidney & upper ureter >> in men radiate to testicle (innervations from dermatome T7,8,9)

Mid Ureter >> radiates to the iliac fossa (Dermatome T10) .. It could be confused with appendicitis if it's in the right side

Distal ureter >> radiates to Trigonal bladder, posterior urethra, scrotal skin, labia majora and lower abdomen

- The patient cannot get comfortable, and may rolled around. " it's very severe pain (MI, labor and ureteric stone, pt can't tolerate and come to the hospital. while pt with appendicitis does not like to move, he will have more irritation"
- Associated with nausea / Vomiting "most of the time due to severe pain"

Differential diagnosis: " any pathology in the lower chest and abdomen"

–**Radiculitis** (pseudo-renal) "have the same radiation, it's a MSK pain because of the irritation to intercostal nerve T7,8,9. The different in history: renal colic usually sudden without aggravation factors. Radiculitis is aggravated by movement while renal stones are relieved by movement and it radiates to the lower limb.. In History taking the patient had carried something heavy"

–Leaking abdominal aortic aneurysms

–Pneumonia

–Myocardial infarction

–Acute appendicitis "moving will aggravate the pain due to peritoneal retention"

–Testicular torsion

–Inflammatory bowel disease (Crohn's, ulcerative colitis)

–Diverticulitis

–Ectopic pregnancy

–Burst peptic ulcer

–Bowel obstruction

Work Up:

–History

–Examination: **patient want to move around**, in an attempt to find a comfortable position.

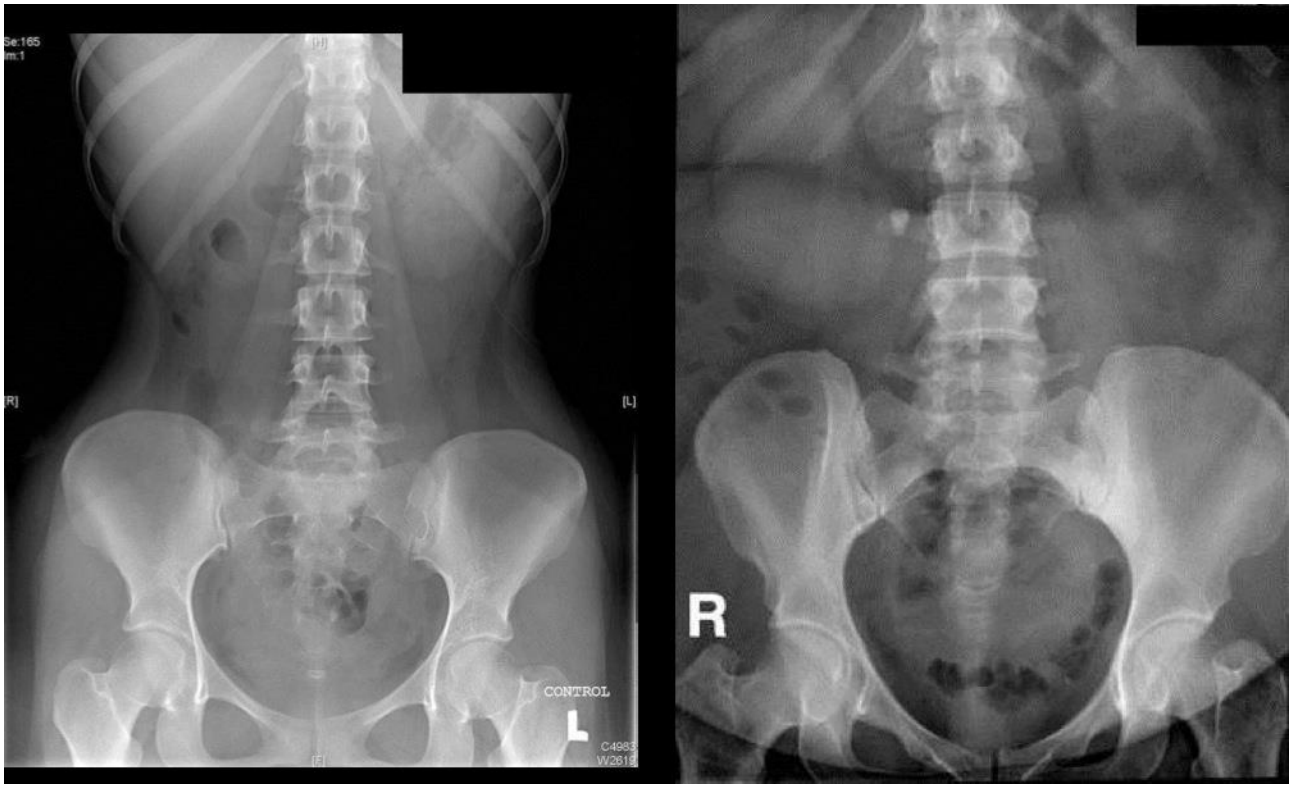
–+/- Fever "supradialysis infection"

–Pregnancy test "to differentiate from ectopic pregnancy and because usually we do x-ray"
–MSU "for microscopic hematuria"
–U&E " urine and electrolytes for renal function"

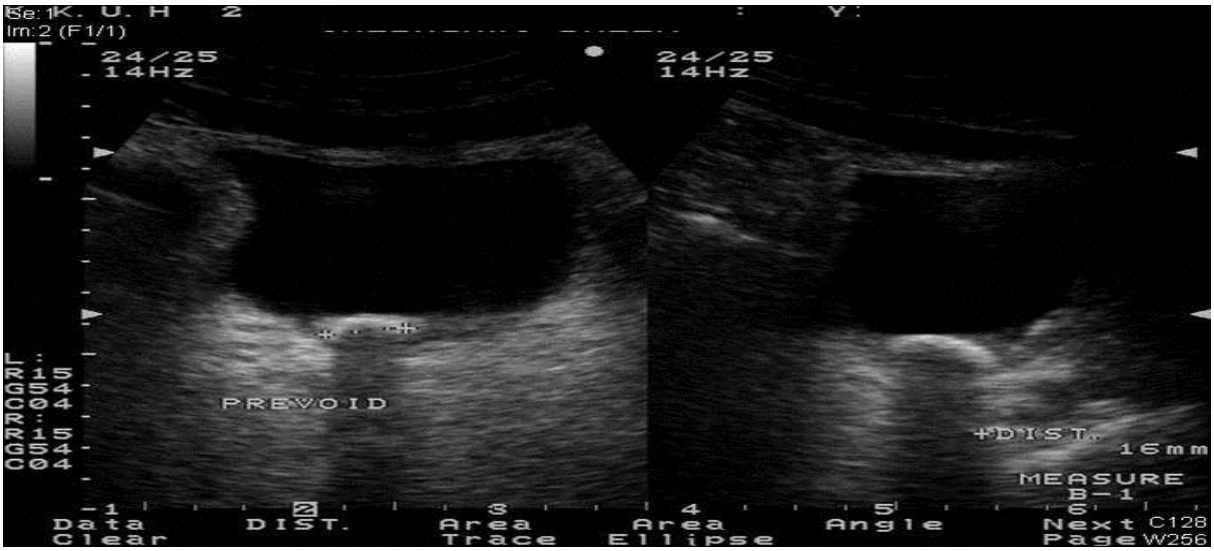
Radiological investigation :

1- KUB "kidney, Ureter and bladder x-ray"

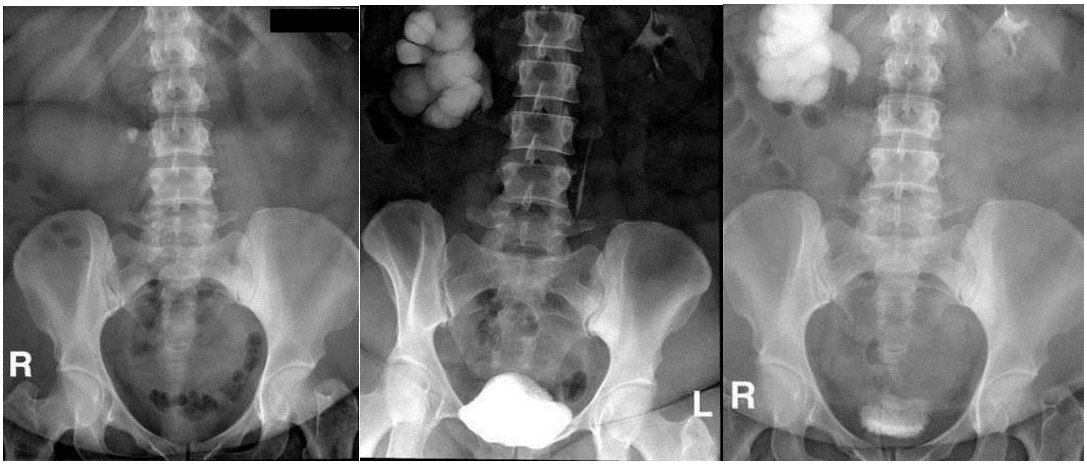
" Look at the details of the bone 1st, then the soft tissue shadow which is sometime penetrated by hematoma or perinephric collection. After that, look at the shadow of the kidney if normal or increased. Then, follow the root of the ureter, you don't see the ureter but you know that it's at the tip of transverse process. Look for any radiopaque (most of the stones are)"



2- **RUS:** "it's not the gold stander for stones, it's not a good tool because stones in the ureter are not seen by the US & not good enough to decide the diagnosis. Not anatomical"

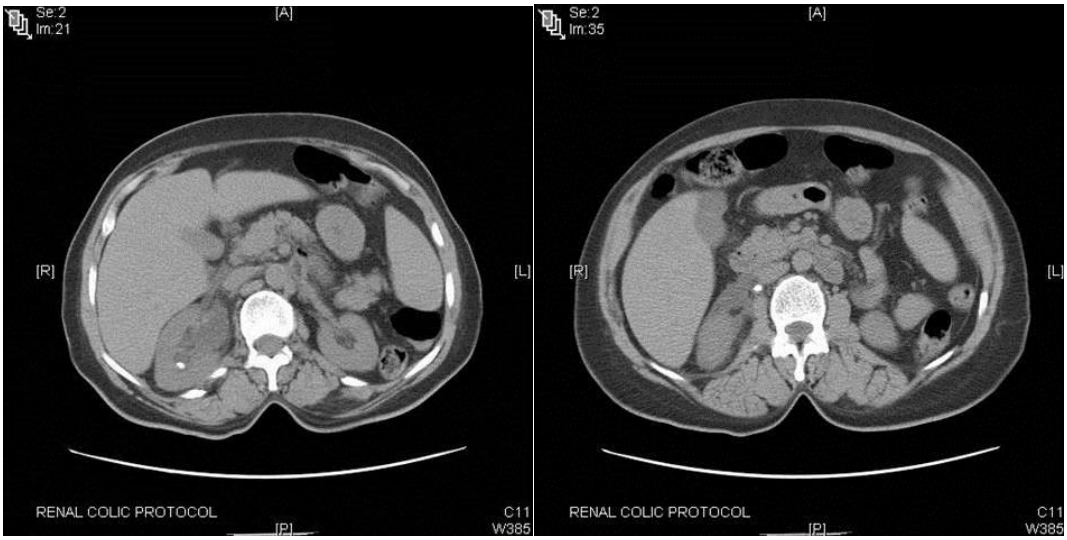


3- **IVU:** " IV urogram used to be use but now rarely. Can confirm the presence of the stone"



4- **Helical CTU: "CT is the gold stander"**

- Greater **specificity** (95%) and **sensitivity** (97%)
- Can identify other, non-stone causes of flank pain.
- No need for contrast administration. "contrast is dangerous, pt with renal impairment >> renal failure, pt with bronchial asthma and allergy >> anaphylactic shock"
- Faster, taking just a few minutes "about 3 minutes"
- the cost of CTU is almost equivalent to that of IVU



5- **MRI** "very rarely, not a stander except for pregnant ladies"

- Very accurate way of determining whether or not a stone is present in the ureters
- Time consuming
- Expensive
- Good for pregnant ladies

Management:

- **Pain relief**:
  - NSAIDs "Voltaren and Profen"
  - Intramuscular or intravenous injection, by mouth, or per rectum
  - +/- Opiate analgesics (pethidine or morphine). "if did not respond to NSAIDs"
- **Hyper hydration**
- **'watchful waiting' with analgesic supplements**
- 95% of stones measuring 5mm or less pass spontaneously

Indications for Intervention:

To Relieve Obstruction and/or Remove the stone

1.Pain that fails to respond to analgesics.

2.Associated fever. "In UTI fever + Pyelonephritis: you have to give antibiotic to drain the kidney"

3.Renal function is impaired because of the stone (solitary kidney obstructed by a stone, bilateral ureteric stones)

4. Obstruction unrelieved (not to exceed 4 weeks) "kidney can function till 4 weeks of obstruction more than it won't be able to function and the obstruction may cause necrosis"

5. Personal or occupational reasons

Surgical intervention:

–Temporary relief of the obstruction:

- Insertion of a JJ stent or percutaneous nephrostomy tube "in renal pelvis and in the bladder"

Definitive treatment:

- **E**xtracorporeal **S**hock**w**aves **L**ithotripsy (ESWL). "non-invasive, just crush the stone by shocking it. For large stone"
- **per**cutaneous **n**ephro**l**ithotomy (PCNL) "make small hole, insert the scope, crush the stone and remove it subcutaneously"
- Ureteroscopy (URS) "commonly used"
- Laparoscopic extraction "very rare"
- Open Surgery: very very limited

3- Urinary Retention: Acute & Chronic.

❖ **Acute Urinary Retention:**

Painful inability to void, with relief of pain following drainage of the bladder by catheterization

Causes:

Men:

- Benign prostatic enlargement (BPE) due to BPH "Very common"
- Carcinoma of the prostate
- Urethral stricture
- Prostatic abscess
- Stones
- Constipation

Women

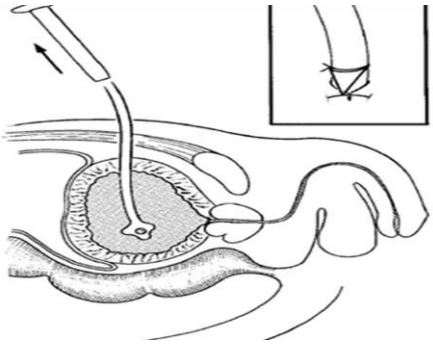
- Pelvic prolapse (cystocoele, rectocoele, uterine)
- Urethral stenosis "very rarely"
- Urethral diverticulum "very rarely"
- Post surgery for 'stress' incontinence
- pelvic masses (e.g., ovarian masses)

Initial Management:

–Urethral catheterization "if it can't pass, consider suprapubic catheter. Used as an analgesics"

–Suprapubic catheter (SPC)


Foley catheter



Late Management: Treating the underlying cause

❖ **Chronic Urinary Retention:** "No pain"

Obstruction develops slowly, the bladder is distended (stretched) very gradually over weeks/months **(Pain not a feature)**

Usually associated with:

Reduced renal function.

Upper tract dilatation.

Presentation:

– Urinary dribbling

– **Overflow** incontinence

– Palpable Bladder "painless"

Management

– Treatment is directed to renal support. "Hyperkalemia"

– Bladder drainage under slow rate to avoid sudden decompression > > > haematuria.

– Late treatment of cause

4- Acute Scrotum:

Emergency situation requiring prompt evaluation, differential diagnosis, and potentially immediate surgical exploration

Differential Diagnosis:

"Torsions are the most IMP"

Torsion of the spermatic cord
Torsion of the appendix testis
Torsion of the appendix epididymis
Epididymitis
Epididymo-orchitis
Inguinal hernia
Communicating hydrocele
Hydrocele
Hydrocele of the cord
Trauma/insect bite
Dermatologic lesions
Inflammatory vasculitis (Henoch-Schönlein purpura)
Idiopathic scrotal edema
Tumor
Spermatocele

Nonurogenital pathology (e.g., adductor tendinitis)

– Torsion of the Spermatic cord

Most serious.

– Epididymitis.

Most common

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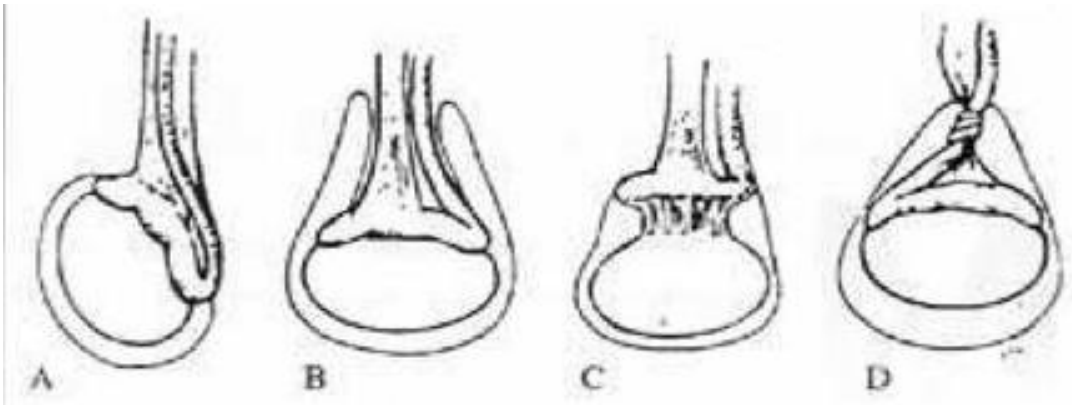
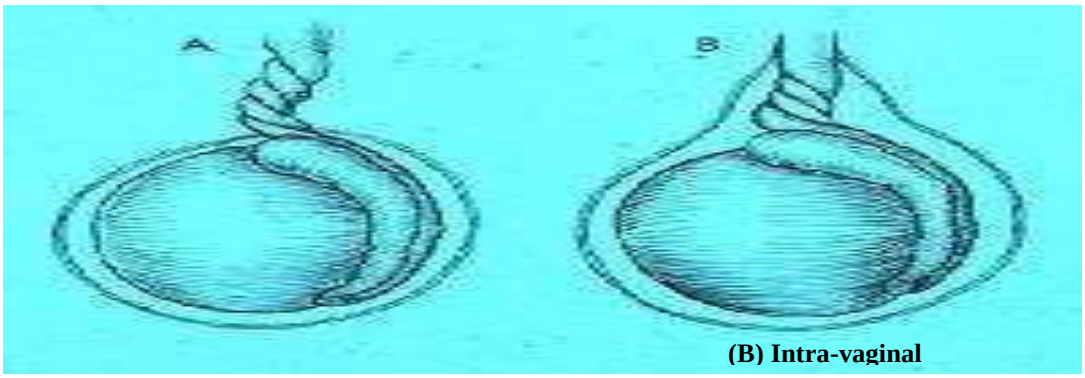
a- Torsion of the Spermatic cord:

- Common among **teenagers** (12-18) years
- Possible in children and neonates
- Unlikely after the age of 25 years "very unlikely"
- **True surgical emergency of the highest order**
- Irreversible ischemic injury to the testicular parenchyma may begin as soon as **4 hours**
- **Testicular salvage ↓ as duration of torsion ↑**

Anatomical variations:



A. Normal anatomy. *B*. The "bell-clapper" deformity. *C*. Loose epididymal attachment to testis. *D*. Torsed testis with transverse lie.



(B) Intra-vaginal

"This does not make any difference in the management, just a classification"

Presentation:

– **Acute onset of scrotal pain.** "Ischemic pain, sharp & severe"

– Majority with history of prior episodes of severe, self-limited scrotal pain and swelling "torsion detorsion"

– **Nausea/Vomiting** "referred to the lower abdomen"

– Referred to the ipsilateral lower quadrant of the abdomen.

– Children might **not** complain of testicular pain "instead they complain of abdominal pain. Any child with abdominal pain + vomiting could be suffering from torsion; you HAVE to examine his genitalia. It's a congenital disease but may be aggravated later on by moving or other factors. Mather says that her child went to school and came back with abdominal pain and vomiting after eating food there"

– Dysuria and other bladder symptoms are **usually absent.**

Physical examination:

- The affected testis is high riding transverse orientation
- Acute hydrocele or massive scrotal edema
- Cremasteric reflex is absent.
- Tender larger than other side
- Elevation of the scrotum causes **more** pain "because of the ischemia, the child won't allow you to touch it, painful"

Adjunctive tests:

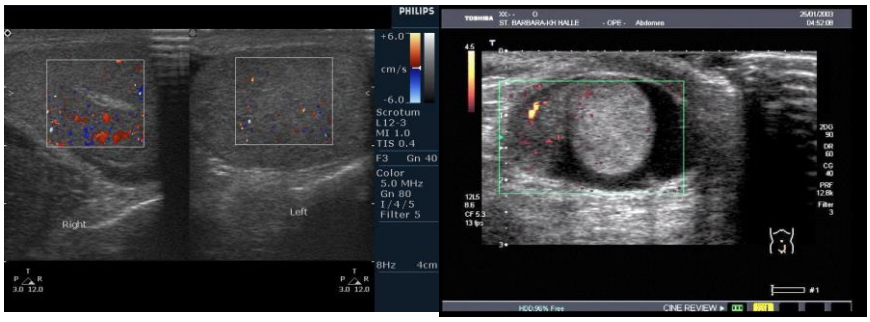
(If the diagnosis is clinically suspicious don't delay the patient for any investigations).

"Don't waste the time doing investigations if you have good clinical suspicion about it, except if you have an US in the ER. **Take him to the OR**"

- To aid in differential diagnosis of the acute scrotum.
- To confirm the absence of torsion of the cord. "do investigations if you are sure 99% it's not torsion"
- Doppler examination of the cord and testis
    - High false-positive and false- negative

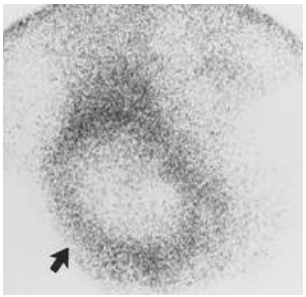
Color Doppler ultrasound:

- Assessment of anatomy and determining the presence or absence of blood flow.
- Sensitivity: 88.9% specificity of 98.8%
- Operator dependent.



Radionuclide imaging :

- Assessment of testicular blood flow.
- A sensitivity of 90%, & specificity of 89% "because some tumors and hematoma give you the same finding"
- False impression from hyperemia of scrotal wall.
- Not helpful in Hydrocele and Hematoma



Surgical exploration:

–A scrotal incision

–The affected side should be examined first

– The cord should be detorsed. "with a needle prick, if there's no blood coming out or if it's black then it's dead"

– Testes with marginal viability should be placed in warm and re-examined after several minutes.

–A necrotic testis should be removed

–If the testis is to be preserved, it should be fixed "to the wall"

–The contra-lateral testis must be fixed to prevent subsequent torsion "even if the first testis is dead

b- Epididymo-orchitis: "very common surgical emergency.This one is common in KSA"

Presentation:

–**Indolent process**. "Gradual. Start gradual with no pain and this' the big difference between orchitis and tortion (sudden & severe pain)"

–Scrotal swelling, erythema, and pain.

–**Dysuria** and fever is more common "pt most of the time have urinary symptoms or urethral discharge or STD e.g. Gonorrhea"

P/E :

–**localized epididymal tenderness**, a swollen and tender epididymis, or a massively swollen hemi-scrotum with absence of landmarks. "if only the epididymis is effected, it will be epididymal tenderness only but the rest oof the testis is normal"

–Cremasteric reflex should be present "absent in the torsion of spermatic cord"

Urine:

–pyuria, bacteriuria, or a positive urine culture "with pus cells"

Management:

–Bed rest for 1 to 3 days then relative restriction

–Scrotal elevation, the use of an athletic supporter

–parenteral antibiotic therapy should be instituted when UTI is documented or suspected. "first treat the infection and then do the procedure"

–Urethral instrumentation should be avoided. "If the pt have urethral problems like restriction, don't do instrumentation if he have acute Epididymo-orchitis, treat him first and do it later to prevent septicemia"

5- Priapism:

Persistent erection of the penis for more than 4 hours that is not related or accompanied by sexual desire. "at any age but mainly age group affected more likely are 5-10 years old & 20-50 years old"

Types:

Ischemic (most common)	**Non-ischemic**
(veno-occlusive, low flow)	(arterial, high flow).
Painful "the pt can't pass urine"	Painless "erection not strong as ischemic"
Due to **hematological disease**, **malignant infiltration** of the corpora cavernosa with malignant disease, or **drugs**. "thrombosis to the venous system causes congestion and thus lead to erection"	Due to perineal trauma, which creates an arterio-venous **fistula.** "secondary to trauma in perineum or pelvic which creates fistula between the artery and vein then the blood clots will accumulate and corpus spongiosum leading to erection"

Causes:

–Primary:

(Idiopathic) : 30% - 50 % "more common"

–Secondary:

- Drugs "Like alpha reductase inhibitor, some prostaglandins"
- Trauma "can lead to non-ischemic"
- Neurological
- Hematological disease "Like sickle-cells disease which is common is Saudi Arabia"
- Tumors "infiltration of the corpora cavernosa (pelvic or prostate)"
- Miscellaneous

The diagnosis:

–Usually obvious from the history

- Duration of erection >4 hours?
- Is it painful or not? "To know if it ischemic or not"
- Previous history and treatment of priapism? "Recurrence in hematological disease pts"
- Identify any predisposing factors and underlying cause

Examination:

–Erect, tender penis (in low- flow)

–Characteristically the corpora cavernosa are rigid and the glans is flaccid "soft".

–Abdomen for evidence of malignant disease "To look for pelvic or abdominal mass. Also, examine lymph nodes for any palpable lymph node"

–DRE: to examine the prostate and check anal tone. "For prostate malignancy"

Investigations: "Most of the time we don't do it, history is enough"

–CBC (white cell count and differential, reticulocyte count).
–Hemoglobin electrophoresis for sickle cell.
–Urinalysis including urine toxicology.
–Blood gases taken from either corpora;

- low-flow (dark blood; pH <7.25 (acidosis); pO2 <30mmHg (hypoxia); pCO2 >60mmHg (hypercapnia)) "Ischemic"
- high-flow (bright red blood similar to arterial blood at room temperature; pH = 7.4; pO2 >90mmHg; pCO2 <40mmHg) "non-ischemic"

–Color flow duplex ultrasonography in cavernosal arteries;

- Ischemic (inflow low or nonexistent)
- Non-ischemic (inflow normal to high).

–Penile pudendal arteriography "We do it if we have suspicion of fistula (non-ischemic), if you found it, you can treat it by immobilizing the artery. Arteriograph the pudendal artery"

Treatment:

–Depends on the type of priapism.

–Conservative treatment should first be tried "Most of the time. Ask the pt to climb the stairs if he could not start the medical and surgical treatment"

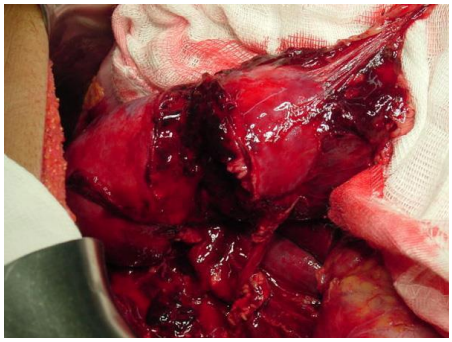
–Medical treatment

–Surgical treatment. "Sometimes we have to shunt and treat the underlying cause. Aspiration, salin wash carbora & typical type of shunt"

–Treatment of underlying cause "The treatment usually combined exchange-transfusion-bicarbonate-oxygenation and other measures"

"it's IMP to warn all the pts wit priapism of the possibility of impotence"

Traumatic Urological Emergencies:



1- Renal Injuries:

- The kidneys relatively protected from traumatic injuries. "By thorax, muscles & abdominal structures, so it has to be strong"
- Considerable degree of force is usually required to injure a kidney.

Mechanisms and cause:

–Blunt

direct blow or acceleration/ deceleration (road traffic accidents RTA, falls from a height, fall onto flank)

–Penetrating

knives, gunshots, iatrogenic, e.g., percutaneous nephrolithotomy (PCNL) "it's the most common penetrating way the doctors do it when they treat large stones"

Indications for renal imaging: IMP

–Macroscopic haematuria–Penetrating chest, flank, and abdominal wounds "indication for (x-ray)"

–Microscopic [>5 red blood cells (RBCs) per high powered field] or dipstick–Hypotensive patient (SBP <90mmHg)

–A history of a rapid acceleration or deceleration

–Any child with microscopic or dipstick haematuria who has sustained trauma "Even without hypotension because children have good catecholamine to prevent shock"

What Imaging Study?

–IVU: "Not the golden stander anymore because of its low sensitivity, replaced by CT"

- replaced by the contrast- enhanced CT
- On-table IVU if patient is transferred immediately to the operating theatre without having had a CT scan and a retroperitoneal hematoma is found "some pts are very severe so we take them to the OR without any imaging and we do IVU in the OR to asses"

–Spiral non contrast CT:

Does not allow accurate staging "does not show us the trauma and the level of it, we need contrast"

Renal US:

Advantages:

–can certainly establish the presence of two kidneys

–the presence of a retroperitoneal hematoma

–power Doppler can identify the presence of blood flow in the renal vessels "Not easy to assess the blood flow by it. Good to follow up to see the degree of the hematoma increased or decreased"

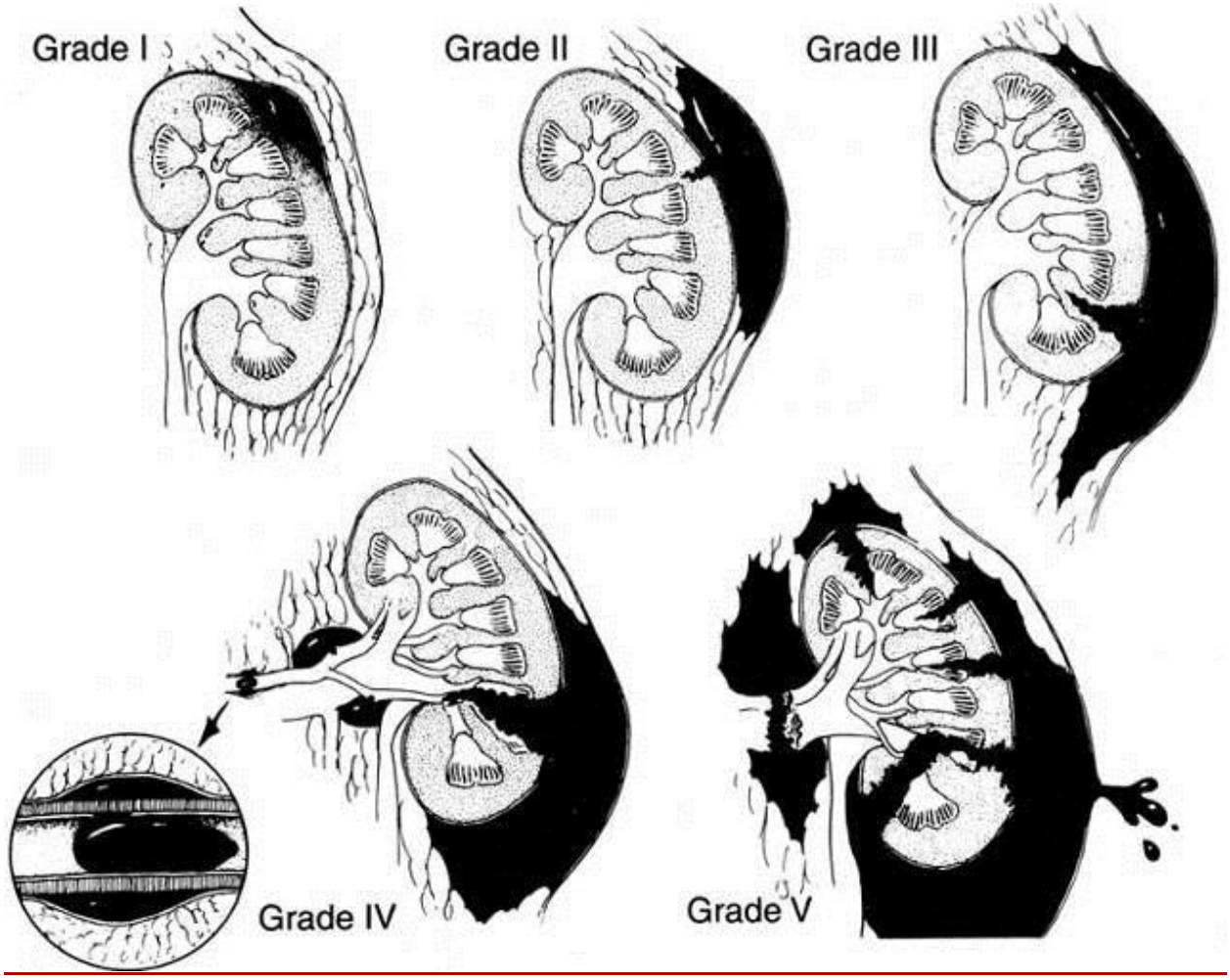
Disadvantages:

–cannot accurately identify parenchymal tears, collecting system injuries, or extravasations of urine until a later stage when a urine collection has had time to accumulate.

–Contrast-enhanced CT:

- **the imaging study of choice**
- accurate, rapid, images other intra-abdominal structures

Staging (Grading):



Grade I: Flank pain + Hematuria With or without subcapsular hematoma, but no evident kidney damage

Grade II: Injury "laceration" to the cortex only of 1cm or less with hematoma

Grade III: injury to the cortex and medulla without reaching the collecting system with hematoma (more than 1 cm)

Grade IV: injury reaching to the collecting system OR thrombosis to the renal vessels on IVU there will be extravasations of contrast and decreased filling reaches the collecting system and there is

extravasation contrast outside the kidney, injuries involving the main renal artery or vein ischemia in part of kidney for example segmental artery " injury reaching to the collecting system OR thrombosis to the renal vessels (segmental artery or vein), on IVU there will be extravasations of contrast"
Grade V: shattered kidney completely damaged thrombosis in all the renal arteries so the kidney doesn't get any blood "or avulsion to the main renal artery or vein"

Management:

–Conservative:

Over 95% of blunt injuries "can be managed conservative without any intervention"

50% of renal stab injuries and 25% of renal gunshot wounds (specialized center).

•Include:

1.Wide Bore IV line. "the pt may have hypotension & need fast transfusion"

2.IV antibiotics. "to avoid infection caused by the hematoma"

3.Bed rest "if the pt is moving, he might have more bleeding"

4.Vital signs monitoring.

5.serial CBC (HCT)

6.F/up US &/or CT. "according to the problem"

Surgical exploration:

–Persistent bleeding (persistent tachycardia and/or hypotension failing to respond to appropriate fluid and blood replacement)
–Expanding peri-renal hematoma (again the patient will show signs of continued bleeding) "the pt is already opened for other injuries like spleen or bowel injury"
–Pulsatile peri-renal hematoma

2- Ureteral Injuries:

The ureters are protected from external trauma by surrounding bony structures, muscles and other organs. "ureter is more protected than the kidney, and when there is trauma to ureter, there is trauma to other organs. Most of its injuries are iatrogenic (caused by doctors)"

Causes and Mechanisms:

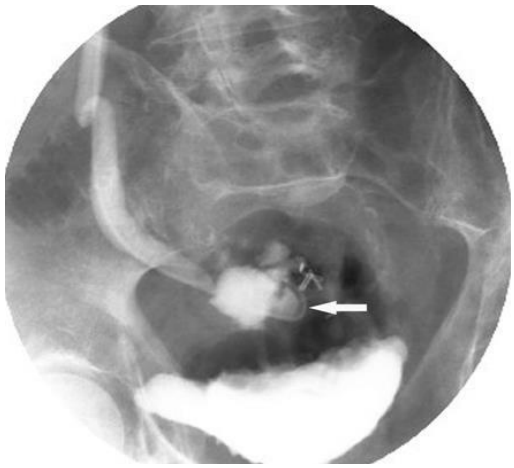
External Trauma	Internal Trauma
Rare "very very rare"	Uncommon, but is more common than external trauma "mostly iatrogenic"
–Severe force is required –Blunt or penetrating. –Blunt external trauma severe enough to injure the ureters will usually be associated with multiple other injuries –Knife or bullet wound to the abdomen or chest may damage the ureter, as well as other organs	Surgery: – Hysterectomy, oophorectomy, and sigmoidcolectomy – Ureteroscopy – Caesarean section "gynecology surgeries" – Aortoiliac vascular graft replacement – Laparoscopic – Orthopedic operations

Diagnosis:

–Requires a high index of suspicion "not easy"

–Intra-operative: "notice the injury in the OR"

–Late:



1. An ileus: the presence of urine within the peritoneal cavity
2. Prolonged postoperative fever or overt urinary sepsis
3. Persistent drainage of fluid from abdominal or pelvic drains, from the abdominal wound, or from the vagina.
4. Flank pain if the ureter has been ligated
5. An abdominal mass, representing a urinoma
6. *Vague abdominal pain*

Treatment options:

–JJ stenting "if the injury is partial like by utoroscopy"

–Primary closure of partial transaction of the ureter

–Direct ureter to ureter anastomosis

–Re-implantation of the ureter into the bladder using a psoas hitch or a Boari flap "if the damage in the distal ureter"

–Trans uretero-ureterostomy "with very high injury. If one kidney is not healty & its ureter is nephritic or injured do TUU which is urinary reconstruction technique that is used to join one ureter to the other across the midline"

–Auto-transplantation of the kidney into the pelvis "very rarely"

–Replacement of the ureter with ileum

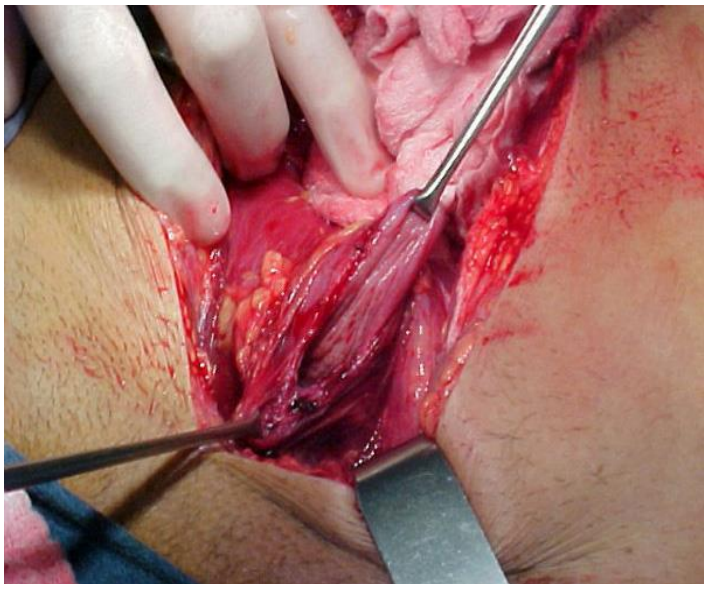
–Permanent cutaneous ureterostomy

–Nephrectomy "if the other kidney is good and the injured kidney is not will function"

4- Bladder Injuries:

Causes:

–Iatrogenic injury:



- Transurethral resection of bladder tumor (TURBT)
- Cystoscopic bladder biopsy
- Transurethral resection of prostate (TURP)
- Cystolitholapaxy "crushing and removing the stone"
- Caesarean section, especially as an emergency
- Total hip replacement (very rare) "& with fracture of pelvis"

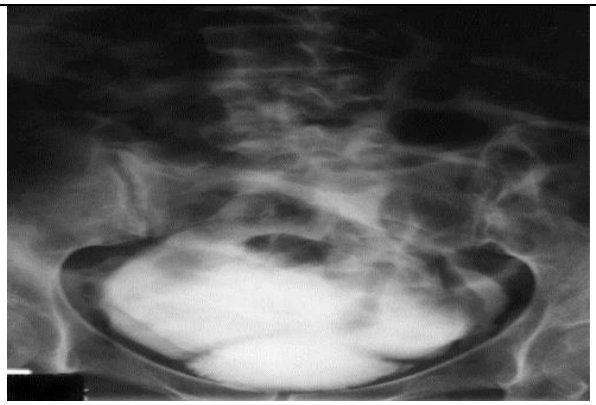
–Penetrating trauma to the lower abdomen or back "stab or gunshot"

–Blunt pelvic trauma—in association with pelvic fracture or 'minor' trauma in a drunkard patient

–Rapid deceleration injury seat belt injury with full bladder in the absence of a pelvic fracture

–Spontaneous rupture after bladder augmentation

Types of Perforation:

A) intra-peritoneal perforation	B) extra-peritoneal perforation
The peritoneum overlying the bladder, has been breached along with the wall the of the bladder, allowing urine to escape into the peritoneal cavity. "you see contrast between intestine"	The peritoneum is intact and urine escapes into the space around the bladder, but not into the peritoneal cavity.
	

Presentation:

–Recognized intra-operatively

–The classic triad of symptoms and signs that are suggestive of a bladder rupture

1. Suprapubic pain and tenderness
2. Difficulty or inability in passing urine
3. Haematuria

Management:

–Extra-peritoneal "managed conservative by foley catheter"

- Bladder drainage +++++
- Open repair +++ "rarely, most of the time we don't need it"

–Intra peritoneal

- open repair…why?
  - –Unlikely to heal spontaneously.
  - –Usually large.
  - –Leakage causes peritonitis.
  - –Associated other organ injury. "Like artery or extravasation or intravasation"

5- Urethral Injury: "rare and very rare in female, mostly in male"

- Anterior urethral injuries
- Posterior urethral injuries

❖ Anterior urethral injuries: Rare "very"

Mechanism:

- The majority is a result of a straddle injury in boys or men. "majority in children by falling on pipe or something in playground causing straddle injury"
- Direct injuries to the penis
- Penile fractures
- Inflating a catheter balloon in the anterior urethra "the most common cause"
- Penetrating injuries by gunshot wounds. "very rare"

Symptoms and signs:

–**Blood at the end of the penis**
–**Difficulty** in passing urine
–Frank haematuria
–Hematoma may accumulate around the site of the rupture
–Penile **swelling**

Diagnosis:

–Retrograde urethrography "usually we do it, we put catheter the begging of the meatus (urethral opening) and inject contrast"

- Contusion: no extravasation of contrast:
- Partial rupture : extravasation of contrast, with contrast also present in the bladder
- Complete disruption: no filling of the posterior urethra or bladder " or extravasation"

Management:

–Contusion

- A small-gauge urethral catheter for one week

–Partial Rupture of Anterior Urethra

- No blind insertion of urethral catheterization (by using cystoscopy and guide wire) "because blind catheterization could increase the damage"
- Majority can be managed by suprapubic urinary diversion for one week
- Penetrating partial disruption (e.g., knife, gunshot wound), primary (immediate) repair.

–Complete Rupture of Anterior Urethra

- patient is unstable a suprapubic catheter.
- patient is stable, the urethra may either be immediately repaired or a suprapubic catheter "if there is not good experience surgeon, use suprapubic catheter"

–Penetrating Anterior Urethral Injuries

- generally managed by surgical debridement and repair "if it's a sharp injury"

❖ **Posterior urethral injuries:** "more common than the anterior"
–Great majority of posterior urethral injuries occur in association with pelvic fractures.
–10% to 20% have an associated bladder rupture.

Signs: "same as the anterior"

- Blood at the meatus, gross hematuria, and perineal or scrotal bruising.
- High-riding prostate. "if the hematoma made a gap that will bush the prostate away"

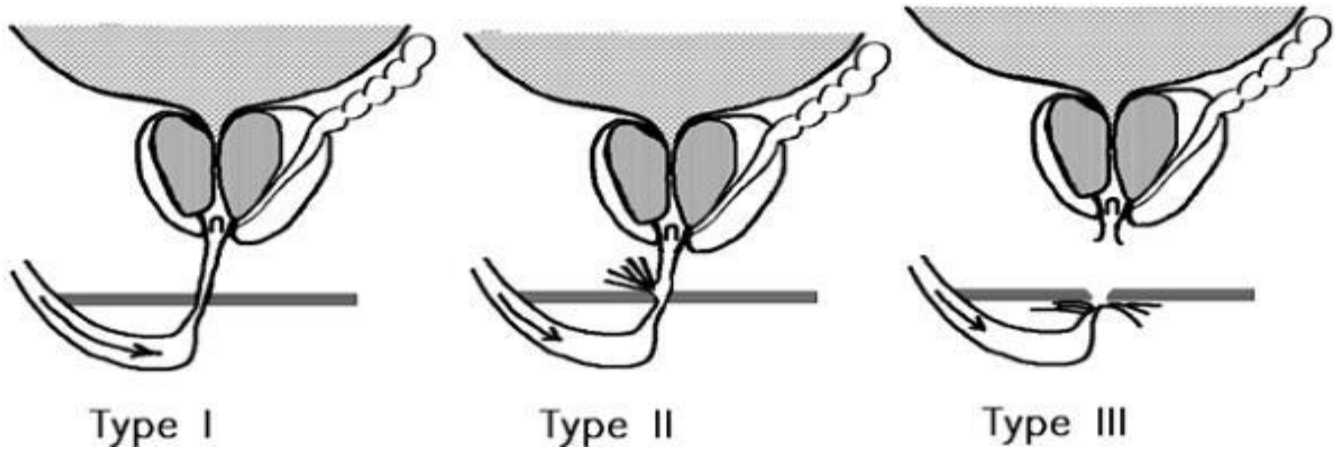
Classification of posterior urethral injuries: "By urethrography"

type I:(rare) "very rare"
stretch injury with intact urethra

type II : (25%)
partial tear but some continuity remains

type III:(75%)
complete tear with no evidence of continuity

In women, partial rupture at the anterior position is the most common urethral injury associated with pelvic fracture.



Management:

Stretch injury **(type I)** and incomplete urethral tears **(type II)** are best treated by stenting with a urethral catheter.

Type III

–Patient is at varying risk of urethral stricture, urinary incontinence, and erectile dysfunction (ED)
– Initial management with suprapubic *cystotomy and attempting primary repair at 7 to 10 days after injury.*

6- External Genital injuries:

- Penile Fracture
- Glans Injury "Circumcision in children"
- Penile amputation and injuries "very risky, most of the pts are psychogenic or there is a crime, you have call the security and psychiatry"
- Scrotal and testicular injuries "mostly occupational (machinery)"

❖ **Female External genitalia injuries:**

Managed by Gynecologists unless the urethra is involved "which is very rare"

Summary

Hematuria	*** Hematuria: If painless, most likely it is cancer. If painful, most likely it is urolithiasis.** *** 40% of gross hematuria cases in ER are malignancy, while only 2% of microscopic hematuria cases in ER might be malignancy.** *** Initial hematuria (beginning of micturition): Damage in urethra.** *** Terminal hematuria (at the end of micturition): Damage in bladder.** *** Total hematuria (from the beginning until the end): Severe and massive causes.** *** Clots: as threads > Kidney. As circular > Distal tract.** *** 70-80% of patients on warfarin come with hematuria.**
Renal colic	*** The patient is rolling around from pain, hence not an appendicitis.** *** Ultrasound cannot detect urethral stones.** *** MRI is rarely useful.**
Urinary retention	*** Most common cause in males is Benign Prostatic Hyperplasia.** *** Rare in females, iatrogenic cause being the commonest.**
Torsion	*** Torsion in pediatrics comes in atypical symptoms (like vomiting).** *** In torsion, cremastric reflex is absent and elevation of the scrotum increases pain. In epididymo-orchitis, cremastric reflex is present and elevation of the scrotum decreases pain.** *** To diagnose torsion radiological, radionuclide is the most sensitive.** *** In epididymo-orchitis patient, use antibiotics.**
Priapism	*** In most cases of sickle cell disease, priapism is the first symptom to appear.** *** Management: Hydration and bicarbonate. If non-ischemic, ligation.**
Traumatic injuries	*** One of the indications to do surgery: Normotensive, pediatric patient with microscopic hematuria.** *** The other indication is persistent hypotension.**
Ureteral injuries	*** Most common cause is iatrogenic.**

Questions:

1- Which ONE of the following is an indication for a surgical intervention in ureteric stones?

a. Gross hematuria
b. The stone is 6 mm in diameter
c. Impaired renal function due to obstruction
d. Stone in distal ureter

2- A 13-year old boy presented to the Emergency Room with painful right scrotal swelling. I t was gradual in onset over the last 5 days. He gave history of dysuria and superapubic pain for the last 2 weeks. The most common cause of his symptoms is:

a. Epididymitis
b. Hydrocele
c. Testicular Torsion
d. Testicular Trauma

3- 15 year old boy presented to emergency department with with 4 hours history of sudden onset scrotal pain which excruciating. On local examination he has significant tenderness of the left hemiscrotum with high lying left testis. What will be the most appropriate next step?

a. Scrotal US with color Doppler study
b. Radionuclide for the scrotum
c. Urine analysis
d. Immediate scrotal exploration

4- 12 years old boy presented to the emergency room with severe sudden testicular pain for 3 hours, with no history of trauma, what is the most likely the diagnosis?

a. Hydrocele
b. Testicular Torsion
c. Tuberculosis epididymitis
d. Varicocele

Answers:

1- C
2- A
3- D
4- B

Notes from Surgical Recall & First Aid:

Hematuria:

- **In hematuria, False positive on dipstick occurs when myoglobin is present.**

- **What can cause gross hematuria with a dipstick negative for blood? Think: Anthocyanin dye in beets and berries, pyridium, rifampin, porphyria, some food colorings.**

CALCULUS DISEASE:

What is the incidence?
1 in 10 people will have stones

What are the risk factors?
Poor fluid intake, IBD, hypercalcemia ("CHIMPANZEES"), renal tubular acidosis, small bowel bypass

What are the four types of stones?
1. Calcium oxalate/calcium PO4 (75%)— secondary to hypercalciuria (c intestinal absorption, T renal reabsorption, c bone reabsorption) 2. Struvite (MgAmPh)(15%)—infection stones; seen in UTI with urea-splitting bacteria (Proteus); may cause staghorn calculi; high urine pH 3. Uric acid (7%)—stones are radiolucent (Think: Uric Unseen); seen in gout, Lesch-Nyhan, chronic diarrhea, cancer; low urine pH 4. Cystine (1%)—genetic predisposition

What type of stones are not seen on AXR?
Uric acid (Think: Uric Unseen)

What stone is associated with UTIs?
Struvite stones (Think: Struvite Sepsis)

What stones are seen in IBD/bowel bypass?

Calcium oxalate

What are the symptoms of calculus disease?

Severe pain; patient cannot sit still: renal colic (typically pain in the kidney/ureter that radiates to the testis or penis), hematuria (remember, patients with peritoneal signs are motionless)

What are the classic findings/symptoms?

Flank pain, stone on AXR, hematuria

Diagnosis?

Stone with concomitant infection

What is the significance of hematuria and pyuria?

Narcotics for pain, vigorous hydration, observation Further options: ESWL (lithotripsy), ureteroscopy, percutaneous lithotripsy, open surgery; metabolic workup for recurrence

Treatment?

KUB (90% radiopaque), IVP, urinalysis and culture, BUN/Cr, CBC

What are the indications for intervention?

Urinary tract obstruction Persistent infection Impaired renal function

What are the contraindications of outpatient treatment?

Pregnancy, diabetes, obstruction, severe dehydration, severe pain, urosepsis/fever, pyelonephritis, previous urologic surgery, only one functioning kidney

What are the three common sites of obstruction?

1. UreteroPelvic Junction (UPJ)
2. UreteroVesicular Junction (UVJ)
3. Intersection of the ureter and the iliac vessels

- **Typical scenario: A 40-year-old man presents with sudden onset left-sided fl ank pain that he rates a 10/10. He is writhing, unable to stay**

still or fi nd a comfortable position. Think: Renal colic. Check a urine dip for blood and order a noncontrast CT scan.

- **Most stones < 5 mm will pass spontaneously in adults.**

TESTICULAR TORSION:

What is it?

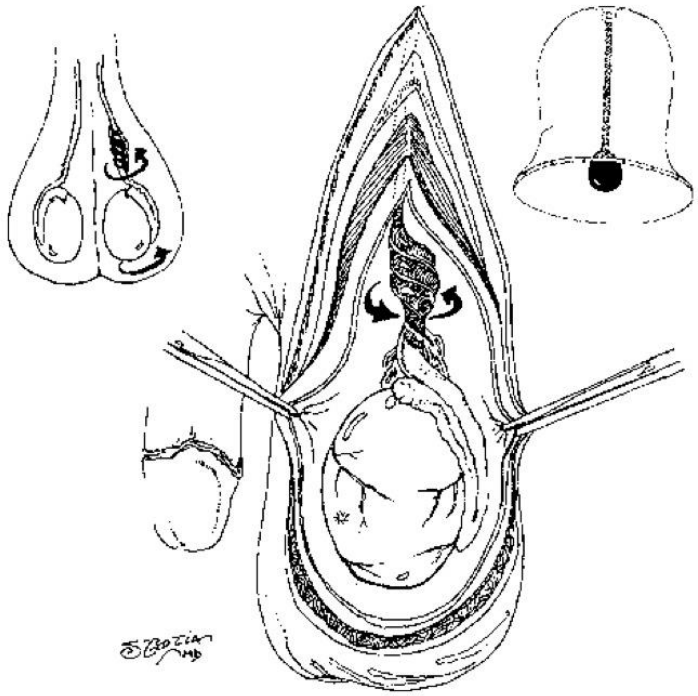
Torsion (twist) of the spermatic cord, resulting in venous outflow obstruction, and subsequent arterial occlusion S infarction of the testicle

What is the classic history?

Acute onset of scrotal pain usually after vigorous activity or minor trauma

What is a “bell clapper” deformity?

Bilateral nonattachment of the testicles by the gubernaculum to the scrotum (free like the clappers of a bell)



What are the symptoms?

Pain in the scrotum, suprapubic pain

What are the signs?

Very tender, swollen, elevated testicle; nonillumination; absence of cremasteric reflex

What is the differential diagnosis?

Testicular trauma, inguinal hernia, epididymitis, appendage torsion

How is the diagnosis made?

Surgical exploration, U/S (solid mass) and Doppler flow study, cold Tc-99m scan (nuclear study)

What is the treatment?

Surgical detorsion and bilateral orchiopexy to the scrotum

How much time is available from the onset of symptoms to detorse the testicle?

6 hours will bring about the best results; 90% salvage rate

What are the chances of tes-ticle salvage after 24 hours?

10%

- **Always suspect torsion in a patient with inguinal/ abdominal pain and an empty scrotum.**

- **Typical scenario: An adolescent presents with acute testicular pain and swelling immediately after a sporting event. He is writing in pain. On further questioning, he has had similar episodes of this in the past. Think: Intermittent testicular torsion/detorsion.**

PRIAPISM:

What are its causes?

Low flow: leukemia, drugs (e.g., prazosin), sickle-cell disease, erectile dysfunction treatment gone wrong High flow: pudendal artery fistula, usually from trauma

What is first-line treatment?

1. Aspiration of blood from corporus cavernosum 2. -Adrenergic agent

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urethral injury:

What are the signs of urethral injury in the trauma patient?

"High-riding, ballottable" prostate, blood at the urethral meatus, severe pelvic fracture, ecchymosis of scrotum

What is the evaluation for urethral injury in the trauma patient?

RUG (Retrograde UrethroGram)

How can a small traumatic EXTRAperitoneal bladder rupture be treated?

Foley catheter

What percentage of patients with an injured ureter will have no blood on urinalysis?

33%

What unique bleeding problem can be seen with prostate surgery?

Release of TPA and urokinase (treat with -aminocaproic acid)