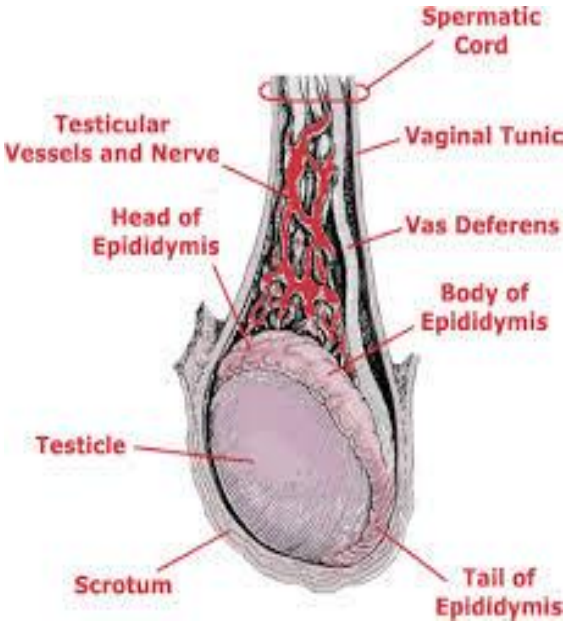
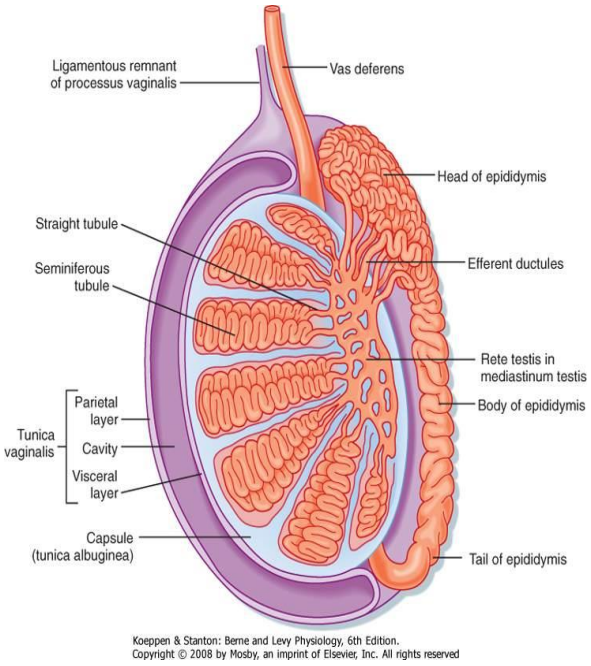
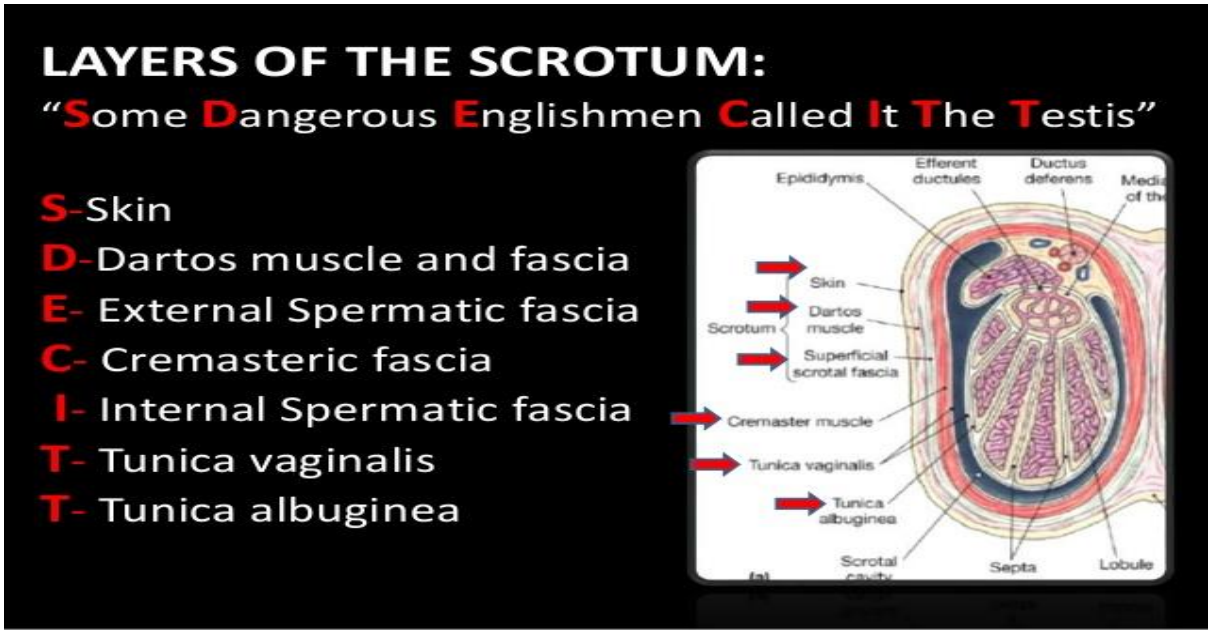
Acute scrotum

د. وليد خالد العبيدي

- Acute scrotum is defined as “the constellation of new onset pain, swelling, and/or tenderness of the intrascrotal contents.
- The acute scrotum is an umbrella term that includes a wide variety of unique disease processes.
- Rapid evaluation and diagnostics are necessary due to the time dependency of certain morbid but reversible conditions, such as acute testicular torsion.
- The vascular anatomy of the scrotal contents is also important to review. The testes receive a joint supply of blood from the testicular artery, deferential artery, and the cremasteric artery. While the deferential artery and the cremasteric artery are branches of the inferior vesical and inferior epigastric artery, respectively, the testicular artery branches directly from the abdominal aorta.
- The testes are drained via small branching veins forming the pampiniform plexus and ultimately the testicular vein. Notably, the testicular vein drains directly into the inferior vena cava on the right while it drains into the left renal vein contralaterally







Aetiology

- The causative etiologies of an acute scrotum are broad including those who are ischemic, traumatic, infectious, inflammatory, neuropathic, acute or chronic, or idiopathic.
- Acute scrotal pain in children is much more likely to represent torsion of the spermatic cord or testicular appendages whereas patient older than 25 are much more likely to have epididymitis.

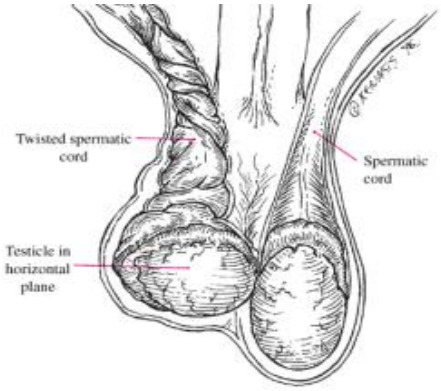
1. Testicular Torsion
2. Testicular appendage torsion
3. Acute epididymitis / epididymo-orchitis
4. Scrotal abscess
5. Scrotal Cellulitis
6. Fournier's gangrene
7. Henoch-Schoenlein purpura
8. Strangulated/Incarcerated inguinal hernia
9. Varicocele
10. Idiopathic Scrotal Edema
11. Testicular neoplasm
12. Testicular trauma

History and Physical

- A focused history and physical examination are essential in the evaluation of the acute scrotum.
- A patient should be interviewed and asked about the onset and duration of symptoms as well as whether they have been continuous or intermittent. The clinical should ask about the history of increased activity, physical exertion, heavy lifting, or direct trauma as well as any objective external signs such as swelling, urethral discharge, erythema, rash, or skin color changes.
- Associated symptoms such as fevers, dysuria, frequency, urgency, hematospermia, abdominal pain, back pain, or weight loss should be required.
- It is also important to ask about relevant comorbid conditions including diabetes, congestive heart failure or any immunocompromised state.
- A sexual history should also be reviewed including number and gender of sexual partners, use of barrier contraceptives (condoms), and history of diagnosis of or treatment for sexually transmitted illnesses.
- Physical examination should include a visual inspection of the fully exposed abdomen, groins, penis, and scrotum. Care should be taken to note any rashes, ulcers, abnormal scrotal asymmetry
- The scrotal contents should be palpated to compare the relative sizes of the testes, detect any obvious intratesticular masses, or other scrotal contents such as hernias. The urethra should be inspected for discharge. Finally, the clinician should investigate bilaterally for the presence of a cremasteric reflex.

TORSION OF THE TESTIS (Torsion of spermatic cord)

- Rotation of the testis around the vertical axis of the cord
- It is time limited due to arterial obstruction & the patient might lose his testis by ischemia (gangrene) if the diagnosis is delayed (6 hours).
- It may develop spontaneously during sleep.
- Straining at stool, lifting a heavy weight, trauma, and coitus are all possible precipitating factors.



Clinical features

- Most common between 10 and 25 years of age
- Sudden agonizing pain in the groin and the lower abdomen.
- The patient feels nauseated and may vomit.
- The testis lies transversely high and the tender twisted cord can be palpated above it.
- Testicular elevation does not relief pain
- Loss of cremasteric reflex.

Diagnosis

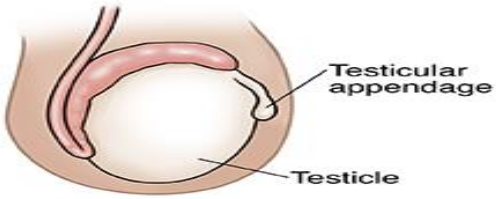
- Doppler ultrasound scan will confirm the absence of the blood supply to the affected testis

Treatment

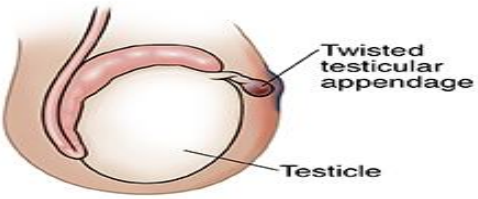
- Exploration for torsion
- If the testis is viable when the cord is untwisted then it is fixed (orchiopexy).
- An infarcted testis (gangrenous) should be removed (orchidectomy).
- The other testis should also be fixed because the anatomical predisposition is likely to be bilateral.
- N.B: In the first hours it may be possible to untwist the testis manually, then early orchiopexy to avoid recurrent torsion.

Testicular Appendage Torsion

- Testicular appendage torsion is the twisting of a small piece of tissue above a testicle.
- The appendage doesn't have a function in the body. But it can twist and cause pain and swelling that gets worse over time.
- It is not the same as testicular torsion. It is not a medical emergency like testicular torsion.
- The symptoms can be similar in both conditions. But the pain of testicular torsion is often more severe.



Normal testicle



Testicular appendage torsion

Symptoms can include:

1. Pain in one testicle, on one side of the scrotum
2. Swelling and redness of the scrotum
3. A blue dot at the top of the scrotum. This shows that the twist is in the appendage, not the testicle.

How is testicular appendage torsion diagnosed?

- Imaging test of your scrotum. This may include an ultrasound.
- In some cases, you may need surgery right away if it appears you may have testicular torsion.

Treatment for testicular appendage torsion includes:

1. Rest
2. Scrotal elevation.
3. Analgesia (NSAID).

EPIDIDYMO-ORCHITIS

- Inflammation confined to the epididymis is epididymitis
- Infection spreading to the testis is epididymo-orchitis.

Mode of infection

- Infection reaches the epididymis via the vas from a primary infection of the urethra, prostate or seminal vesicles
- Blood-borne infections of the epididymis are less common
- Acute epididymo-orchitis can follow any form of urethral instrumentation. It is particularly common when an indwelling catheter is associated with infection of the prostate.

Cause of Acute epididymo-orchitis

1. acute bacterial orchitis
   a. secondary to UTI
   b. secondary to STD
2. acute non-bacterial infectious orchitis: viral
3. acute non-infectious orchitis
   a. idiopathic
   b. traumatic
   c. autoimmune
4. chronic orchitis } persists for
5. chronic orchialgia } >6wks

⇒ Mumps is most common cause of viral orchitis, have associated parotitis (mumps - paramyxovirus), usually unilateral} more likely viral if bilateral

Clinical features

1. The initial symptoms are those of urinary tract infection.
2. The epididymis and testis swell and become painful.
3. Fever
4. The scrotal wall, at first red, edematous and shiny, may become adherent to the epididymis.
5. Resolution may take 6–8 weeks to complete.
6. Acute epididymo-orchitis develops in about 10-30% of males suffering from mumps. The main complication is testicular atrophy, which may cause infertility if the condition is bilateral.

Investigations

1. Urinalysis
2. Urine C&S
3. WBC count
4. RBS
5. Scrotal U/S: rule out torsion & malignancy (in chronic orchitis/orchialgia)

Treatment

1. Rule out Testicular torsion
2. Bed rest + Scrotal support+ hydration
3. Broad spectrum antibiotics for 2 weeks (3^{rd} generation cephalosporin or quinolones)
4. Supportive therapy (analgesics, antipyretics, anti-emetics, IV. fluid.)
5. If suppuration occurs (Abscess): drainage is necessary.

Potential complications of acute Acute epididymo-orchitis is

1. abscess formation
2. testicular infarction & atrophy
3. chronic scrotal pain
4. infertility.

Acute idiopathic scrotal edema (AISE)

- self-limiting condition characterized by marked edema of the skin and dartos fascia without involvement of the deeper layers, testes, or epididymis. It is an important condition to recognize in order to avoid unnecessary surgical exploration.
- it mostly occurs in children <10 years of age.
- The exact etiology of AISE is unclear. It has been hypothesized that it represents a hypersensitivity reaction related to a variant of angioneurotic edema. It has been associated with eosinophilia, with a 66.7% incidence in one case series.

Clinical presentation

- Swelling and erythema in the scrotal wall are characteristic, but the condition is not universally painful. AISE can be unilateral or bilateral (approximately 90% of cases are unilateral.

- Ultrasound is the imaging modality of choice in the investigation of the acute scrotum. Thickening and edema of the scrotal wall, hypervascularity of the scrotum, and normal appearance of the testes are considered specific for the condition.

- AISE is a self-limiting condition, which tends to resolve in around 3-5 days. NSAIDs and antibiotics have been used in management.

- A correct diagnosis can obviate surgical intervention and the characteristic ultrasound findings can be particularly helpful given the overlap in clinical presentation with testicular torsion and other conditions.

Testicular trauma

What factors protect the testis from injury?

1. scrotal mobility
2. reflex cremasteric muscle contraction
3. tough fibrous tunica albuginea

What are the causes of testis trauma?

1. Blunt trauma (75%): assault, sports-related events, MVA.
2. Penetrating trauma (25%): GSWs, explosions, impalement injuries

⇒ 30% are bilateral

⇒ 80% associated with non-GU injuries (thigh, perineum, femoral vessels)

How is testicular trauma diagnosed?

⇒ physical exam } swelling & ecchymosis are variable

⇒ degree of hematoma does not correlate with severity of testis injury

⇒ absence of hematoma does not rule out testis rupture

⇒ **rule out concomitant urethral injury**.

⇒ imaging} U/S is the investigation of choice, to assess integrity and vascularity of testis, inhomogeneity of parenchyma + disruption of tunica albuginea suggests testis fracture

⇒ **if U/S is equivocal but physical exam is suspicious, always explore**

What is the management of testicular trauma?

Early exploration & repair is beneficial

1. increased testis salvage
2. reduced convalescence time and disability
3. earlier return to normal activities
4. preservation of fertility and hormonal function

What is the management of penetrating scrotal injuries?

⇒ explore to rule out vascular and vasal injury

What are the outcomes of testis rupture management?

- non-operative management often complicated by:

1. infection
2. atrophy
3. necrosis
4. delayed orchiectomy} 3-9fold higher.

⇒ **90% testis salvage rate with exploration + repair within 3 days of injury, 33% salvage rate with conservative management**

⇒ salvage rate for penetrating testis trauma is only 30-60%

Scrotal gangrene (Necrotizing fasciitis, Fournier's gangrene)

- Fulminating inflammation of the subcutaneous tissues, which results in an obliterative arteritis of the arterioles to the scrotal skin
- Most commonly occurs in immunocompromised patients (DM)
- Causative organisms: mixed infection of Hemolytic streptococci (sometimes microaerophilic), *Staphylococcus*, *E. coli*, *Clostridium welchii.*

Clinically:

- Sudden scrotal inflammation. The condition can follow minor injuries or procedures in the perineal area, such as a bruise, scratch, urethral dilatation, injection of haemorrhoids or opening of a periurethral abscess.
- Cellulitis spreads, Rapid onset of gangrene and loss of scrotal skin leading to exposure of the scrotal contents,
- entire scrotal coverings slough, leaving the testes exposed but healthy
- The absence of any obvious cause in over half the cases.
- pyrexia.

Treatment

- The microorganisms are usually sensitive to gentamicin and a cephalosporin
- Wide excision of the necrotic scrotal skin
- Many patients die despite active treatment.

Acute scrotum: Points to remember:

- The acute scrotum should be approached similarly to the acute abdomen.
- The differential diagnosis is broad but may be narrowed based on the patient's demographics, risk factors, history, and physical examination.
- Suspected testicular torsion is a time-dependent surgical emergency and consultation should be not delayed.
- The most appropriate imaging modality is usually Doppler ultrasound.
- Despite "classic" presentations, a cremasteric reflex does not definitively confirm nor exclude torsion, and the testicle may be salvageable long after the 6-hour window.

Thank You

2021-2022