MEDICAL UNIVERSITY OF VIENNA

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ARAB SCHOOL OF UROLOGY

Benign Scrotal pathologies

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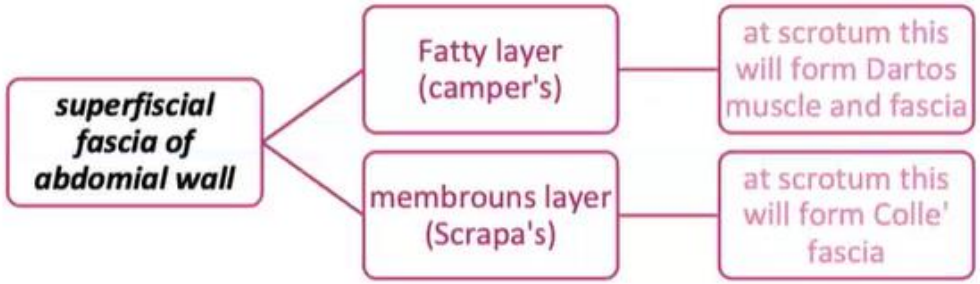
Anatomy: Scrotum

1. Thin external skin → Cutaneous pouch → continuous with the anterior abdominal wall
2. Contains : Testes, Epididymis, and part of spermatic cords.
3. Usually not symmetrical
4. Embryologically → from labioscrotal folds

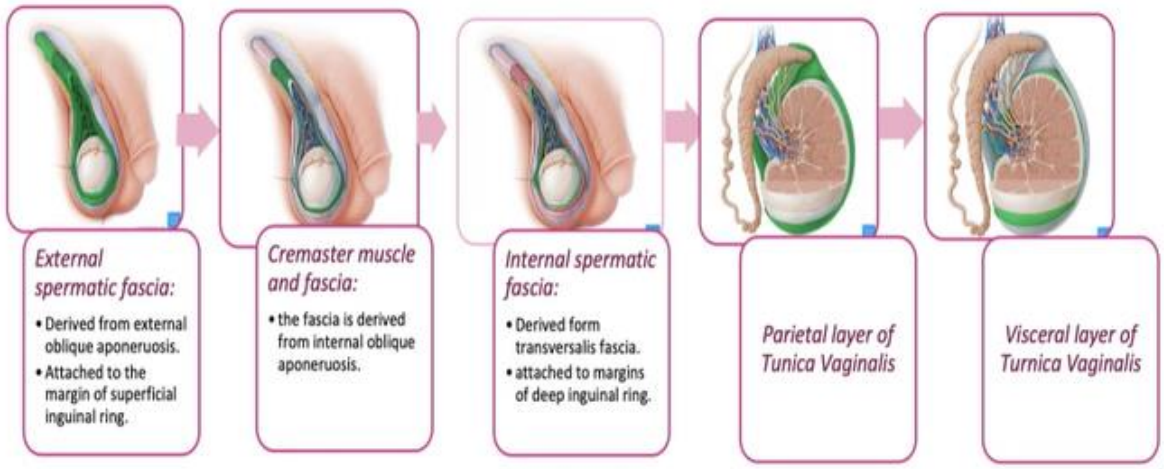
Anatomy: Scrotum

- Skin → Dartos muscle and fascia→ Colle's Fascia
- External spermatic fascia → Cremasteric muscle/Fascia → Internal spermatic Fascia
- Tunica Vaginalis → Tunica Albuginea
- These layers avoid testes from being injured + regulate scrotal temperature

Anatomy: Scrotum



Anatomy: Scrotum



Anatomy: Scrotum

- External pudendal artery → Anterior scrotal artery
- Internal pudendal artery → posterior scrotal artery
- Scrotal veins → External pudendal vein

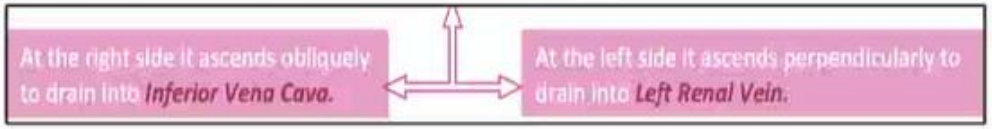
Anatomy: Testes

- Firm, mobile organs within the scrotum
- Separated by a septum formed by superficial fascia **(Dartos muscle and Colle's fascia)**
- Left testis usually lies at a lower level than the right testis
- The testes are surrounded by a tough fibrous capsule *Tunica Albuginea* → It sends a series of fibrous septa dividing the interior of the testis into lobules
- In each lobule, there are 1-3 coiled seminiferous tubules
- Tubules open into a network of channels called the rete testis
- Small efferent ductulus connect the rete testis to the head of the epididymis

Anatomy: Testes

Blood supply and venous drainage of testes:

I. *Blood supply* → Testicular artery [on each side], branch of abdominal aorta [L2].
II. *Venous drainage* → Pampiniform plexus → Testicular vein, right side drains into Inferior Vena Cava, while left side drains into left Renal Vein.

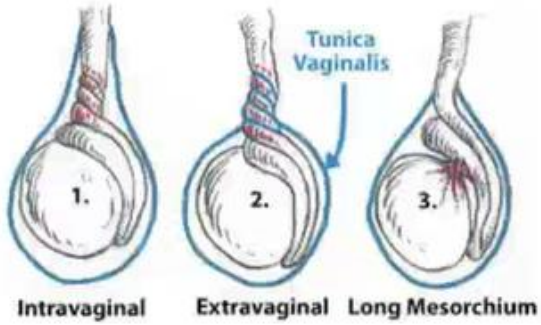


Nerve supply:

I. Testes → Sympathetic fibers around Testicular Artery [Vasomotor/sensory]
II. Scrotum → Same *sympathetic fibers* to testes. In addition to *ilioinguinal nerve*[L1] and *genital branch of genitofemoral nerve* [which also supplies cremasteric muscle].

Testicular torsion

- Urological emergency
- Twisting of the testicle in the spermatic cord leading to constriction of the vascular supply = time-sensitive ischemia and necrosis of testicular tissue.
- Probability of testicular salvage declines significantly



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- BIMODAL DISTRIBUTION

1. EXTRAVAGINAL TORSION → NEONATES (PERINATAL PERIOD)

   concomitant torsion of the testis and tunica vaginalis

2. INTRAVAGINAL TORSION → MALE OF ANY AGE, MOSTLY ADOLESCENTS

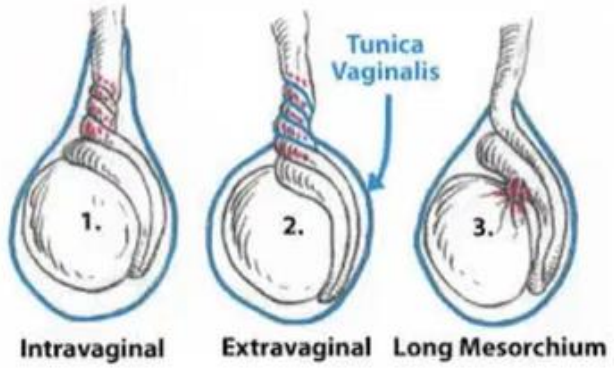
   Testis twists within the tunica vaginalis

   BELL-CLAPPER deformity

Intravaginal Torsion:

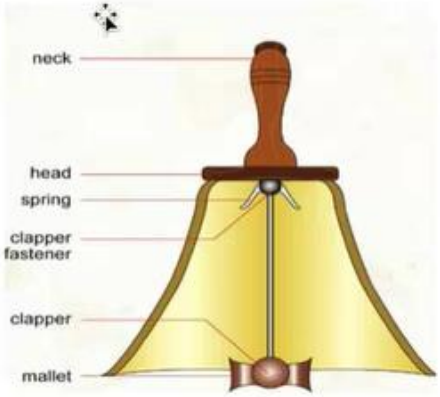
Testicle descends through the inguinal canal covered by tunica vaginalis → Normally attaches to the testicles inferior posteriorly and superiorly

If both attachments of the tunica vaginalis occur superior to the testicle → Bell-clapper deformity → increased mobility of the testis within tunica vaginalis → torsion of testis



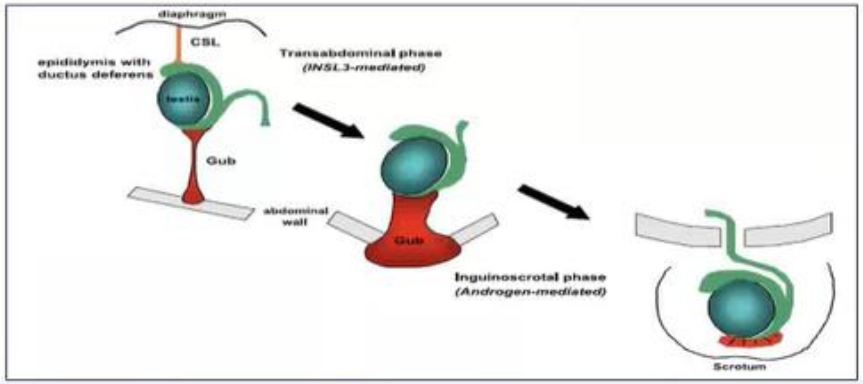
Why Bell-Clapper ?

- Failure of normal posterior anchoring → leaves the testis free to swing and rotate within the tunica vaginalis of the scrotum→ like the gong (clapper) inside of a bell.



Extravaginal Torsion:

- What is gubernaculum ?
- Gelatinous tissue → during development pulls the testis through the abdomen → inguinal canal → scrotum
- The upper part degenerates/ Lower part persists as the gubernaculum testis (scrotal ligament)
- lack of fixation of the tunica vaginalis to the gubernaculum ⟶ concomitant torsion of the testis and tunica vaginalis



Long Mesorchium: A rare form of intravaginal torsion

Mesorchium → thick band of connective tissue between the efferent ductules of epididymis and posterior surface of testis

Elongation → torsion of testis along the Mesorchium

HOW TO APPROACH THE PATIENT ?

Testicular torsion should be diagnosed clinically

should have a high index of suspicion maintained in order to identify and provide definitive treatment as quickly as possible

A history + physical exam → warrants immediate surgical exploration without delay for any additional diagnostic tests.

If history and exam leading to an unclear diagnosis → additional diagnostic studies to allow for definitive diagnosis and avoid unnecessary surgery

Click to add title

Male 12 to 18 years old

sudden-onset severe scrotal pain

often with associated nausea and vomiting

Testicular salvage rates decline as the duration of symptoms increases

Patients presenting with symptoms lasting less than 4 to 6 hours duration have a greater likelihood of testicular viability

Click to add title

Physical exam:

General abdominal exam → some may experience abdominal pain

Genital exam →

- Transverse lie and may be in a higher position ("high-riding") than the unaffected testis
- Palpation → severe tenderness of the affected testicle
- Cremasteric reflex→ may be absent in cases of torsion
- Negative Prehn's sign → Elevation of the testis does not result in any pain relief (vs. acute epididimytits)
- Not all patients present with all of these findings→ **Testicular tenderness** alone may exist without other signs suggestive of torsion.

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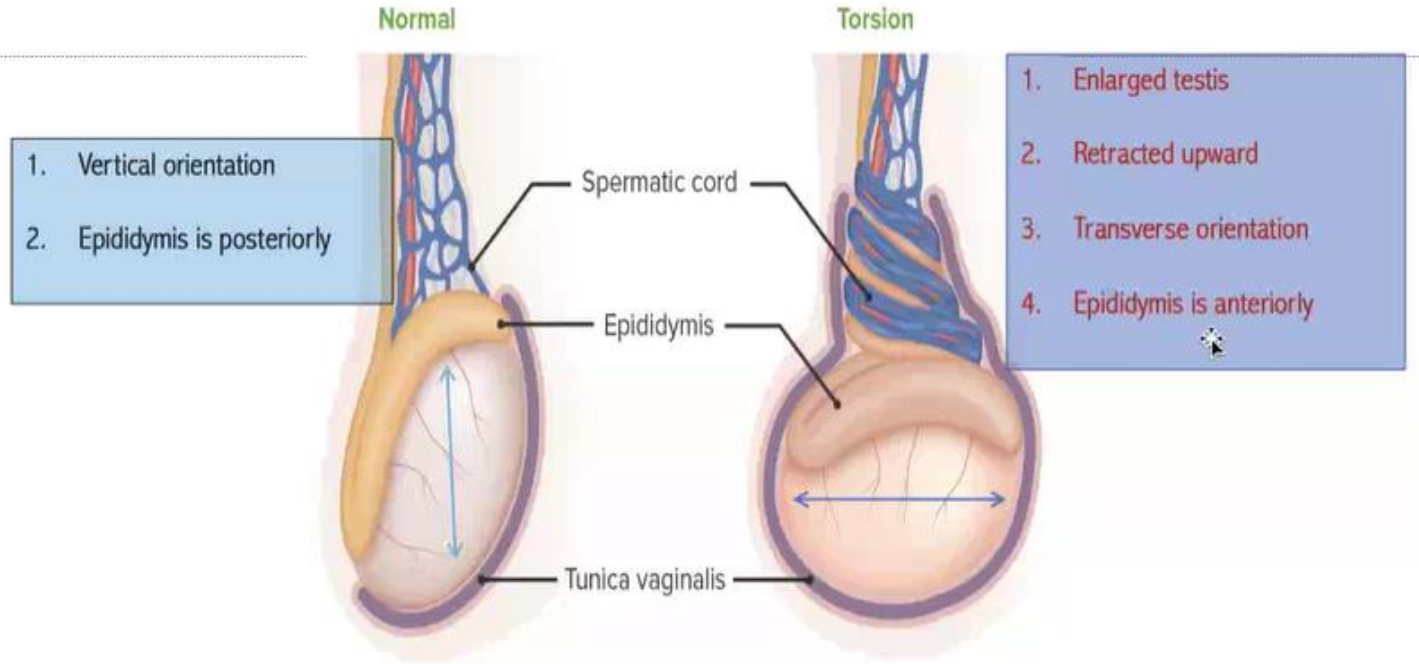


Investigations :

1. Ultrasound → Grey-scale/ power-Doppler/ color-Doppler/ spectral-Doppler
2. Urinalysis

Investigations :

Ultrasound → Grey-scale/ power-Doppler/ color-Doppler/ spectral-Doppler

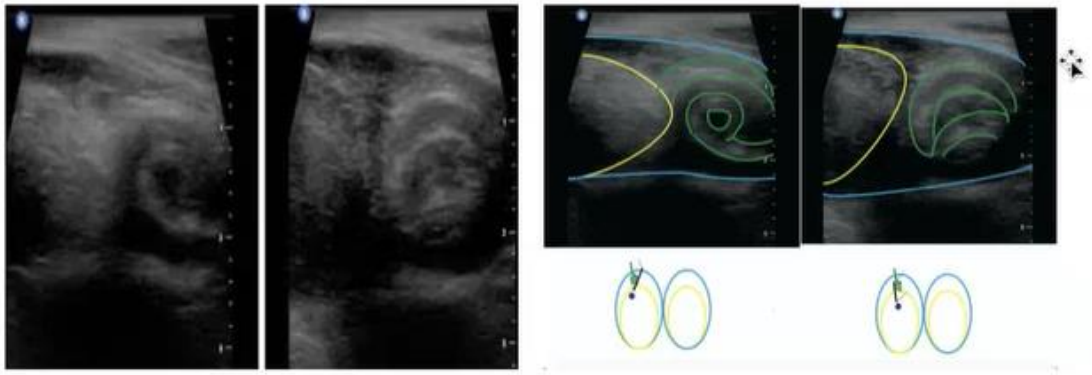
Gray-scale ultrasound → nonspecific information + will not suffice for diagnosis → can identify anatomy, the presence of fluid, and the *whirlpool sign.*

whirlpool sign → swirling appearance of the spermatic cord from torsion → is a specific sign

Color and power Doppler studies are also needed to establish the presence or absence of blood flow to the testicles

Investigations :

whirlpool sign → swirling appearance of the spermatic cord from torsion → is a specific sign



Investigations :

RESULTS → usually normal

If abnormal → suggest epididymitis or orchitis

Important to keep in mind :
the urinalysis may be negative in cases of epididymitis or orchitis and positive in testicular torsion

Click to add title

Management :

The duration of symptoms is inversely related to the degree of testicular viability

Patients presenting with symptoms lasting less than 4 to 6 hours duration have a greater likelihood of testicular viability.

Postnatal Torsion :
Normal scrotum at birth
Acute scrotum → Erythema and tenderness

Prenatal Torsion :
Hard non-tender scrotal mass → atrophied testis noted at birth

Click to add title

Management :

Postnatal Torsion :
Normal scrotum at birth
Acute scrotum → Erythema and tenderness

Immediate surgical exploration → essential to optimize testicular salvageability

Decision for orchiectomy versus orchidopexy is based on the extent of damage to testicular tissue

If viable testis → detorsion + Orchidopexy

If non-viable → Orchiectomy → to avoid damage to contralateral testis due to formation of anti-perm Antibodies

Complications

COMPLICATION	TIMEFRAME	LIKELIHOOD
infarction of testicle/permanent testicular damage/loss of testicles	short term	high
infertility secondary to loss of testicle	long term	high
psychological implication of losing a testis	variable	high
cosmetic deformity	variable	high
recurrent torsion	variable	medium
impaired pubertal development (significant or bilateral testicular loss)	variable	low

Time is Testicle

Duration of Torsion (Hours)	Testicular Salvage (%)
<6	85–97
6–12	55–85
12–24	20–80
>24	<10

Torsion of testicular appendages :

1. The most common cause of acute scrotum → torsion of appendix testis or appendix epididymis

2. Age 7-10 years

Present as :

A. Sudden onset of pain
B. Normal urinalysis
C. Appendage may be palpated and focally tender
D. Rarely, blue dot sign is seen during physical exam
E. Erythema and edema

Torsion of Testicular appendages :

A. Sudden onset of pain
B. Normal urinalysis
C. Appendage may be palpated and focally tender
D. Rarely, blue dot sign is seen during physical exam
E. Erythema and edema

Torsion of Testicular appendages :

- ***SELF-LIMITING*** AND MANAGED WITH :

1. NSAIDS
2. RESTRICING ACTIVITY
3. WARM COMPRESSOR

- However, usually surgical exploration is done to not miss if it was a testicular torsion

Acute epididymitis :

Click to add title

inflammation of the epididymis = pain and swelling that develops over the course of a few days and lasts <6 weeks

It is usually unilateral

majority of patients aged 20 to 39 years

The condition is referred to as acute epididymo-orchitis if concurrent inflammation of the testis is present

In sexually active men:

by sexually transmitted organisms including:

1. *Chlamydia trachomatis*
2. *Neisseria gonorrhoeae*
3. *Mycoplasma genitalium.*

In older men :

causative organisms are often enteric pathogens, and epididymitis may be associated with :

1. bladder outlet obstruction
2. recent instrumentation of the urinary tract

Retrograde ascent of urinary pathogens

- Urethra and bladder→ via the ejaculatory ducts → vas deferens → to the epididymis
- The inflammatory process starts in the tail of the epididymis and subsequently spreads to the body and head of the epididymis
- In many cases, the testis is involved in the inflammatory process, and the condition is referred to as epididymo-orchitis.

Click to add title

Causes

bacterial

In Sexually active:

1. *Chlamydia trachomatis*
2. *Neisseria gonorrhoeae*

Non-sexually transmitted infection → enteric pathogens:

1. E.Coli
2. Tuberculosis
3. Brucella
4. Candida

Viral

Mumps orchitis

(as part of an outbreak)

UK 2005-2006

Vasculitis

1. Behçet's syndrome
2. Henoch-Schönlein purpura

Click to add title

Causes

Drug-Induced

reversible, sterile epididymitis is a rare adverse effect of therapy with the anti-arrhythmic drug amiodarone

Idiopathic

History :

Risk factors :

1. Sexual history
2. History of viral infection
3. History of Tuberculosis infection
4. BOO
5. UTI
6. RECENT INTRUMENTIZATION
7. IMMUNOSUPPRESSION

Pain :

Unilateral scrotal pain and swelling of gradual onset (vs Testicular torsion)

Examination:

Hemiscortum:

1. hot, erythematous, swollen
2. tender enlargement of the epididymis

DRE

1. assess BPH/BOO
2. exclude tender prostate → prostatitis

Investigations:

To determine the underlying cause

1. urethral swab → gram stain → assess for presence of urethritis
2. Urine dipstick → + leukocytes/culture

Click to add title

1. Bacterial cause → Antibiotics/ supportive measures

2. Underlying vasculitis → referral to rheumatologist/supportive measures

3. tuberculous → RIPE/ supportive measures

4. Viral → supportive measures

5. Amiodarone-induced → dose reduction/discontinuation/ supportive measures

Click to add title

Acute epididymitis: treatment

SUPPORTIVE MEASURES :

Bed rest and scrotal elevation are recommended until signs of local inflammation or fever have resolved.

Analgesics such as paracetamol should be continued until fever and local inflammation subside.

Non-steroidal anti-inflammatory drugs (NSAIDs) may be of benefit.

Non-selective NSAIDs may be added to paracetamol to reduce pain. The smallest effective dose is used for the shortest possible time or intermittently.

If patients are systemically ill with signs of sepsis, intravenous fluid replacement and initial intravenous antibiotic therapy may be indicated.

Click to add title

Testicular Torsion VS. Acute epididymitis

Testicular torsion	Epididymo-orchitis
Most frequently between ages 10-30 (peak 13-15 years of age).	Rarely occurs before puberty. Occurs in sexually-active males
Hemiscrotum	
Sudden	Sudden or gradual
Radiates to groin, flank or epigastrium	
Associated with nausea	Not associated with nausea
Wakes patient from sleep	Less severe pain
Hx of minor trauma to testis, or previous episodes (torsion-detorsion)	Hx of urethritis, STC, urinary infection (LUTS), prolonged or recent catheterization
Patient is writhing, trying to find comfortable position	
Testis is swollen, tender, high-riding, spermatic cord torsion is palpable	Epididymis is swollen, tender and painful
Absent cremasteric reflex. Not relieved by elevating scrotum	Relieved by elevating scrotum

Spermatocele:

1. A benign cystic accumulation of sperms often multiple
2. Usually located on the upper pole (superior & posteriorly)
3. Arising from the epididymis, efferent ductules or rete testis
4. Usually asymptomatic

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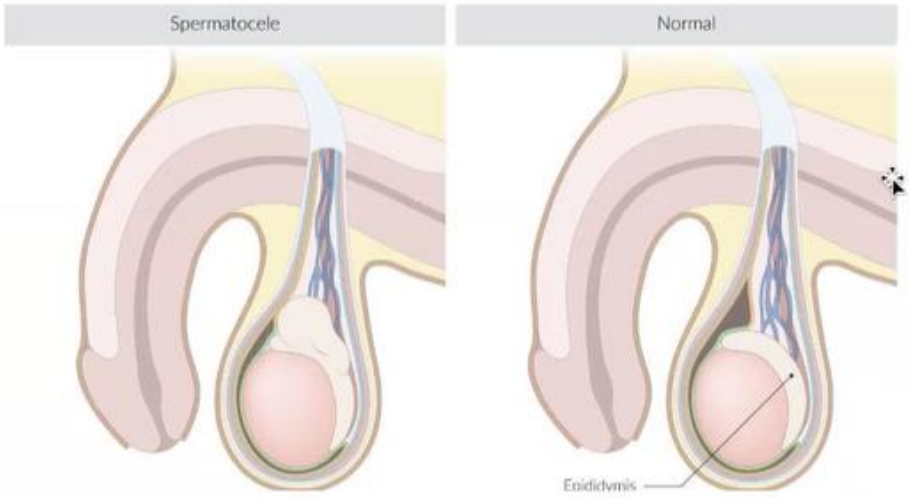

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Spermatocele

Presentation

1. Fluctuant swelling of the upper pole
2. Positive transillumination test

Investigations

Ultrasound: Hypoechoic dilation of epididymal duct or rete testis

Treatment

- *spermatocelectomy*
- Indications:
  Discomfort
  pain
  progressively enlarging

Hydroocele:

•Serous fluid collection in the tunica vaginalis of the scrotum or along the spermatic cord, common in newborns but can occur at any age.

1. May present unilateral or bilateral
2. Most commonly in pediatric patients-> resolves within one year
3. In adults-> most commonly acquired
4. Production absorption imbalance
5. Hydrocele must be differentiated from inguinal hernia

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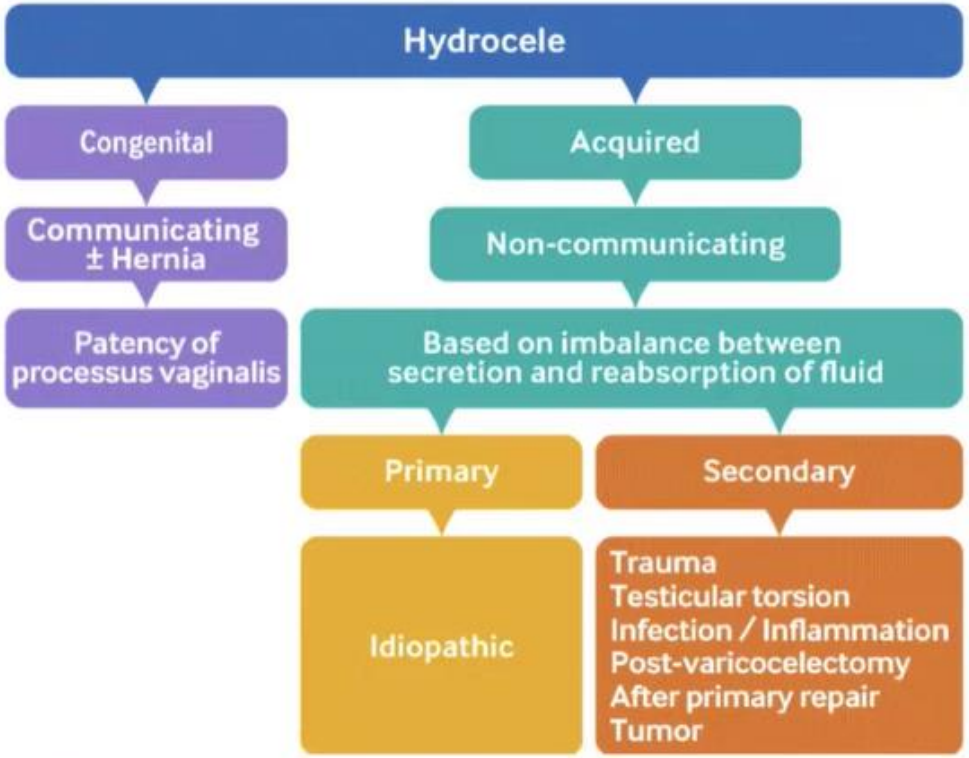


Click to add title Hydrocele

History

Pain /(may be painless)
Swelling
Heaviness
-if communicating: variable size during the day / smaller at morning/ increase with IAP

Physical examination

Fluctuant painless swelling

•+ve transillumination

•Palpation of testes is imp. Should rule out hernia

Hydrocele

Click to add title

Investigations

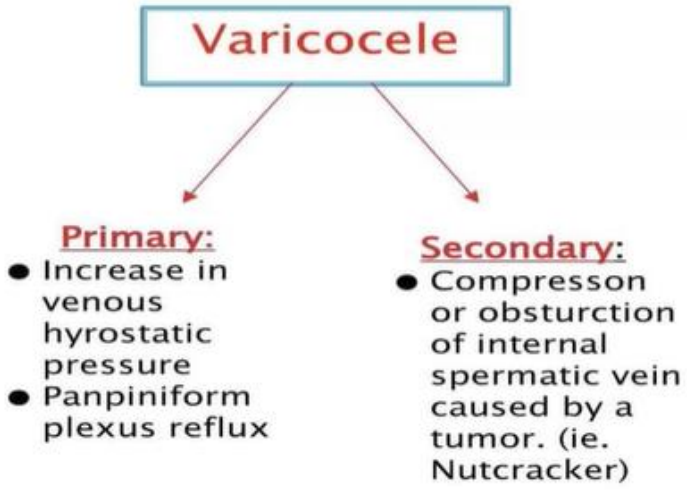
-Ultrasound: (to confirm)
-If other causes are suspected (patient presented with fever, gi symptoms)

Treatment

Age:
-< 18 years for pediatric surgery
•->18 years: 1st line is observation
• Hydrocelectomy
• Aspiration and sclerotherapy

Varicocele:

- Abnormal enlargement and tortuosity of the pampiniform venous plexus and the internal spermatic vein.
- Most common cause of scrotal enlargement in men



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- Primary is much more common (approximately 80-90%) in the left testicle than in the right because of several anatomic factors:

1- The angle at which the left testicular vein enters the left renal vein (runs vertically).

2- The lack of effective anti-reflux valves at the junction of the testicular vein and renal vein.

3- The increased renal vein pressure due to its compression between the superior mesenteric artery and the aorta.

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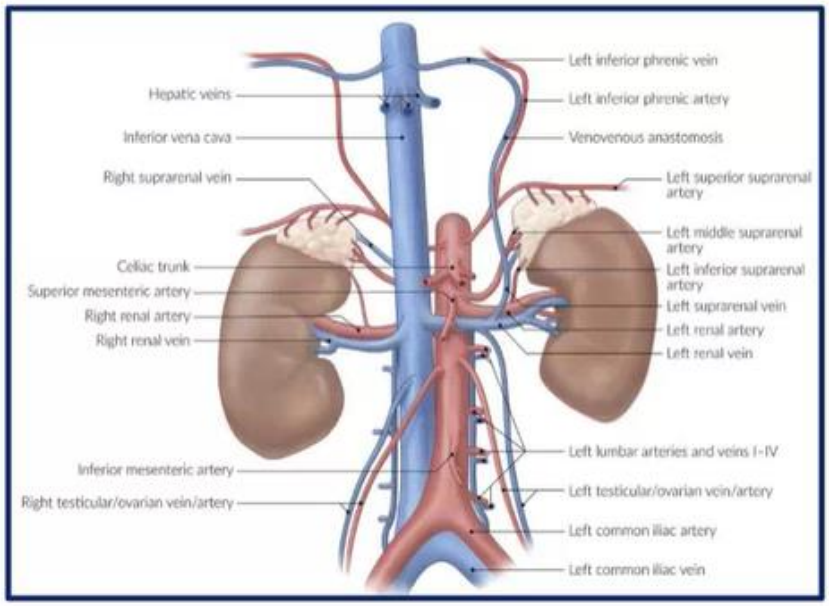

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varicocele

History

- Dull aching pain /(may be painless)
- Swelling
- Heaviness of the scrotum
- Worsening symptoms with standing and Valsalva maneuvers

Physical examination

- -ve transillumination
- Soft band on palpating the upper pole of the affected scrotum (bag of worms)

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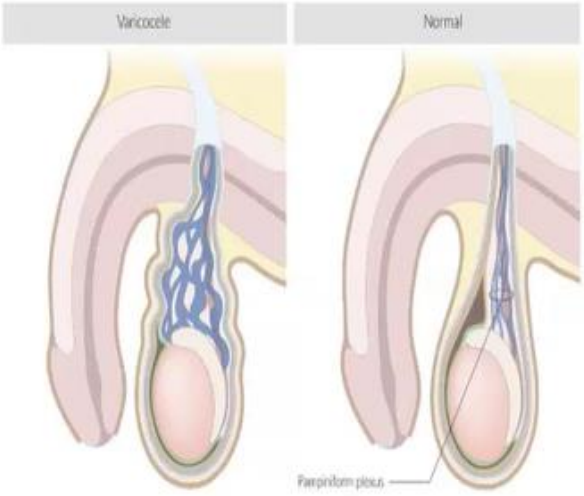


Click to add title varicocele

Investigations

Ultrasound: dilated >2mm hypoechoic pampiniform vessels
-doppler us for grading
-Semen analysis: varicoceles are associated with reduced sperm count and motility, and abnormal morphology (oligoasthenoteratospermia)

Treatment

-Laparoscopic/open varicocelectomy
-percutaneous embolization
*indications:
pain
infertility

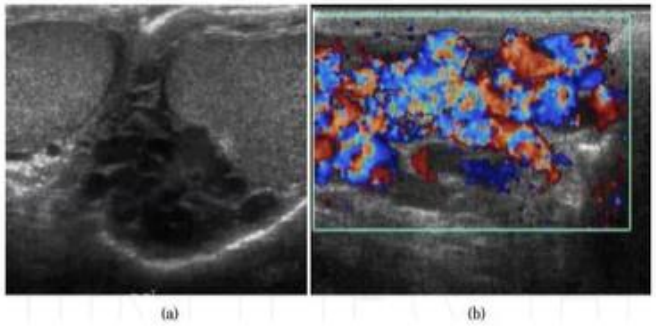
Click to add title

Grading:

1: Palpable only with Valsalva

2: Palpable on standing without Valsalva

3: Visible through the scrotum skin



Hematococele:

- Accumulation of blood in the space between the parietal and visceral tunica vaginalis

- Blood-filled cavitary cyst that may be calcified with long duration

Click to edit the title

Presentation

- Painful swelling

investigations

- Ultrasound

Pathology

- following trauma
- post surgery

Treatment

- mild: conservative
- moderate-severe: drainage

Penile fracture

- Traumatic rupture of the tunica albuginea and one or both corpus cavernosum
- Blunt trauma or abrupt lateral bending of the penis in an erect state
- concomitant injury to the penile urethra may occur
- Aggressive intercourse (penetrative partner on top) or masturbation

- Presentation:
  - Cracking, snapping, or popping sound
  - Immediate detumescence (loss of erection)
  - Pain
  - swelling, curving, and hematoma of the penis
  - Blood at the urethral meatus
  - urinary retention, and/or gross hematuria in concomitant urethral injury

Penile fracture

Diagnosis

- Clinical diagnosis
- Retrograde urethrography (if suspected urethral injury before insertion of indwelling catheter

Treatment

- Surgical repair

Click to add title