Pediatric Inguinal & Scrotal Conditions

- **Important**
- Notes (Doctors'/students')

431 SURGERY TEAM

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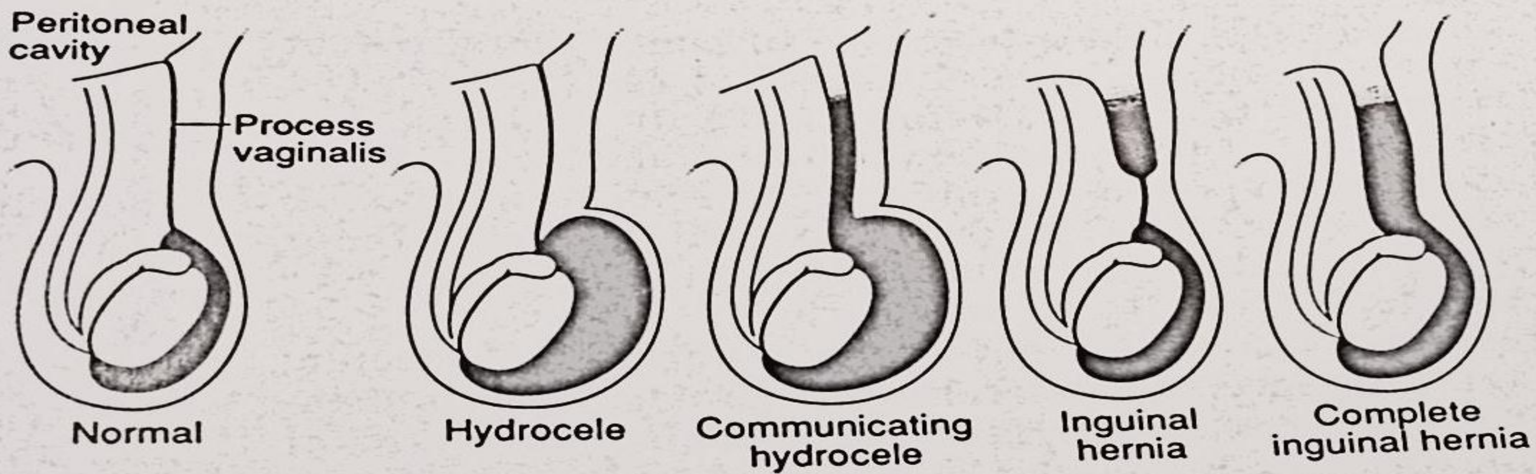
Inguinal Hernias & Hydrocele



- The processus vaginalis is present in the developing fetus at 12 weeks in utero
- The processus is a peritoneal diverticulum that extends through the external inguinal ring
- As the testis descends at the 7th to 8th month, a portion of the processus attaches to the testis, as it exits the abdomen and is dragged into the scrotum with the testis (Guided by the Gubernaculum)
- Processus Vaginalis (PV): is an embryonic developmental outpouching of the peritoneum that connects the peritoneal cavity to the external genitalia to allow the passage for the testes.
- **Etiology for hydrocele and Inguinal Hernia:** **Failure of the processus vaginalis to close (Patent Processus Vaginalis, PPV). In hydrocele,** the PPV is **not that wide,** only the **fluid** travels from the peritoneal cavity to tunica vaginalis around the testis (communicating hydrocele). In **inguinal hernia,** PPV is **wider** so bowel, omentum or the fallopian tubes to go through the PPV.

Inguinal Hernia

- **Congenital**, prevalent (1-5% boys), more in: **premature, males, in the right side.**
- **Indirect (99%):** (In children all the time it is indirect inguinal hernia meaning the structure passes through normal anatomy, deep ring > inguinal canal > superficial ring. Indirect hernias: lateral to the inferior epigastric a.)

History and Examination:

- **Intermittent groin swelling.** (A lump that comes and goes spontaneously.)
- **(REDUCIBILITY),** the most reliable sign, **Note: all reducible masses are simple hernias, but some hernias are complicated and IRREDUCIBLE.**
- **Silk glove sign:** the **thickening and silkiness of the spermatic cord** which can be palpated as the cord crosses the pubic tubercle. This indicates presence of hernia sac around the cord.
- Asymptomatic until get complicated
- In girls, lump in upper part of labia majora

Hydrocele

History:

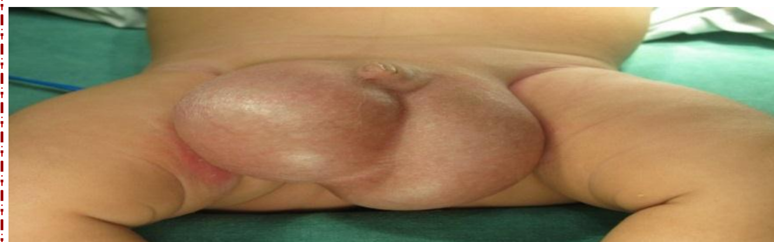
- **Scrotal swelling** (Downward upwards to the groin)
- **Asymptomatic**
- **1% over one year of age**

Examination:

- **Get above the swelling**
- **Not reducible (most accurate)**
- **Transilluminates** (Reflects the light from the tourch; indicating the presence of fluid; not so reliable)

Management:

- **Surgery not advised < 2 years of age** (most hydroceles recover spontaneously after sometime and leaving them will not cause complications; so surgery is advised to be done **after 2y of age**)
- **Ligation of PPV**



Inguinal Hernia (Continued)

Complicated Inguinal Hernias

Incarcerated hernia	**Irreducible swelling** (and the doctor is **able to push it back** to the abdominal cavity)	No evidence of bowel obstruction or strangulation	**Urgent herniotomy**. +/- Sedation and analgesia. Manual Reduction
Obstructed hernia	**Irreducible swelling** (Maybe a doctor can or cannot push it back)	Symptoms and signs of **bowel obstruction** (bilious (green) vomiting, abdominal distention, constipation)	**Emergent herniotomy**
Strangulated hernia	**Irreducible swelling** (and the doctor **is NOT able to push it back** because of the ischemia)	Symptoms and signs of **strangulation** (severe groin pain (1st sign), fever, tachycardia, **skin discoloration of the groin** (most reliable sign))	**Emergent herniotomy** +/- bowel resection

Emergent: within few **hours** Urgent: half a day to 2 **days** Elective: **after** 2-3 days

Herniotomy: An operation in which the hernia sac is removed without any repair of the inguinal canal is described as a herniotomy. Also called celotomy.

Management:

- **Herniotomy (as soon as it is feasible) (Don't leave them!)** (**Not herniorrhaphy;** for adults to strengthen the muscles)
- **Ligation of the PPV at the level of the deep ring**

Associated conditions (with inguinal hernia):

- Cystic Fibrosis
- Connective tissue disorders (Ehlers-Danlos syndrome, Hunter-Hurler syndrome)
- Developmental dysplasia of the hip (DDH)
- Chronic peritoneal dialysis
- Preterm infants with intraventricular hemorrhage
- Myelomeningocele with VP-shunt
- Undescended testis

Undescended Testis

Definitions:

- **True undescended testes:** Normally, testes descend from the genital ridge to the scrotum. If it stopped anywhere in the normal pathway above the scrotum, it is called true undescended testes "Retained testis".
- **Ectopic:** It stops anywhere rather than the normal pathway, most commonly in the superficial inguinal pouch.
- **Retractile:** The testis descends normally at birth, but goes up again due to hyperactivity of the cremasteric muscle (cremasteric reflex). It may be milked again though. It can also ascend in the inguinalcanal spontaneously. (Normal and does not need intervention)

Incidence:

- At birth: 3-4% - At one year: 1% - Pre-term: 30%

Indications:

- **Abnormal fertility** - **Testicular tumor** - Cosmetic/Social -Trauma/Torsion

Descent of Testis – 2 Phases

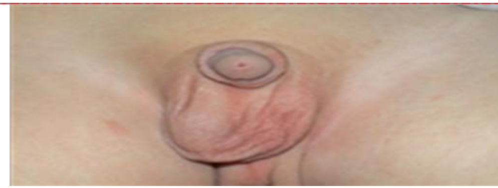
- 10-15th week: the gubernaculum enlarges to anchor the testis near the inguinal region as the embryo enlarges
- 28-35th week: the gubernaculum migrates out of the inguinal canal across the pubic region and into the scrotum
- The processus vaginalis develops as a peritoneal diverticulum within the elongating gubernaculum, creating an intraperitoneal space into which the testis can descend

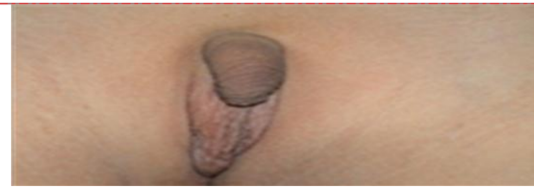
In case of undescended testes, the processus vaginalis is patent (PPV)

Undescended Testis (Continued)

Diagnosis:

- Parents/Doctors
- Clinical features
  - **Empty scrotum**
  - Palpable or not
  - Milk it down to scrotum (Try to place it in the scrotum with your hand, if youre able it's rectactile > no intervention)
- Imaging have limited role to locate the testis
- **Laparoscopy** (Diagnostic and Therapeutic)


Palpable 80%


Non palpable 20%

Treatment after 6 months (After this age, the surgery will not improve fertility, decrease risk of cancer. Before this age, the testis may descend)

- **Open orchiopexy**
- **Laparoscopy assisted orchiopexy** (The surgeon use an endoscope through the umbilicus to locate the testicle and fix it in the scrotum)
- Two stages Fowler-Stephens orchiopexy

Acute Scrotum

Introduction:

- **Acutely painful** +/- swollen +/- red scrotum

Pediatric surgical emergency!!!

Causes:

- **Testicular Torsion** **(serious condition!)**
- **Torsion of Appendage(s) (commonest)** **(In pre-pubertal boys)**
- **Epididymo-orchitis** **(commonest in post-pubertal)**
- Idiopathic Scrotal Edema
- Other conditions e.g. Incarcerated hernia, Acute hydrocele, HSP, Trauma

3- Idiopathic Scrotal Edema

Introduction:

- Cause?
- Peak age: 4-5 yrs

Presentation:

- Swollen, red scrotum **(Bilateral salmon like color)**
- Minimal pain

Management:

- **Conservative**, self-limiting within 1-2 days

1- Testicular Torsion

Introduction:

- Incidence: 1:4000
- Two peaks: peripubertal and perinatal (14 years of age)

Symptoms:

- Lower abdominal pain and vomiting
- **Hemiscrotal pain** (Severe **sudden** onset pain referred to lower abdomen)
- Swollen → red hemiscrotum (late sign indicates ischemia)

Signs:

- Tender
- **Cremasteric reflex- absent (most specific)**
- **Lies higher than contralateral testis**
- Horizontal in position
- Duration of Torsion and Testicular Salvage

Investigations: (Don't do these, time is critical! Unless the diagnosis is not clinically obvious)

- Color Doppler US
- Radionuclide Scan

Management: (Emergent!)

- **Timing is critical 4 - 6 hrs (High chance to save the testis)**
- **Exploration if any doubt**
- **Untwist (open book) and assess viability**
- Fix the other side (likely to have the same condition if left without fixation)
- **If more than 12 hrs**, it is likely to be non-viable and **may need orchiectomy**.

2- Torsion of Appendage(s)

Introduction:

- Embryological remnants of the mesonephric and mullerian duct system occur as tiny (2-10mm long) appendages of testis
- Appendix testis (hydatid of Morgagni), appendix epididymis …etc
- Peak age: 10-12 yrs

Presentation:

- pain – more gradual onset
- **Blue dot sign** **in the upper part of scrotum**
- Swollen → red hemiscrotum
- **Color Doppler scan**

Management: **Conservative** (If Dx is sure) or **operative if torsion cannot be excluded**

Questions:

1- Regarding the scrotal swellings:
 a. Haemetocele is very common
 b. Hydrocele could be inguinoscrotal
 c. Solid epididymal swelling is usually tumor
 d. Transluminant testicular mass is a tumor9
 e. Usually examined with the patient lying down

2- The first symptoms of strangulated Inguinal Hernia is:
 a. Vomiting
 b. Fever
 c. Septic shock
 d. Constipation
 e. Pain

3- The following are important steps in the management of strangulated hernia except:
 a. Nasogastric tube
 b. Antibiotics
 c. Conservative treatment until obstruction is relieved
 d. Intravenous fluids
 e. Consent for possible bowel resection

4- Which one of the following clinical future helps to differentiate between inguinal hernia and hydrocele in children?
 a. Reducibility
 b. Scrotal swelling
 c. Tenderness
 d. Transillumination

5- Patent processus vaginalis results in:
 a- indirect inguinal hernia
 b- direct inguinal hernia
 c- femoral hernia
 d- umbilical hernia

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

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

7- A mother brought her child to the family clinic and he had a swelling in the genitalia. On examination the baby had no pain and was found to have an irreducible scrotal mass. The treatment should be on:

a. An urgent base
b. An emergent base
c. After 6 months
d. After 2 years

8-The LANDMARK to differentiate between direct and indirect inguinal hernia is

a. Superior epigastric vessels
b. Inferior epigastric vessels
c. Transversals fascia
d. Inguinal ligament

9- Which one of the following is the most common cause of ACUTE SCROTUM in pre-puberty boys :

a. Epididymo-orchitis
b. Testicular Torsion
c. Idiopathic scrotal Edema
d. Torsion of appendages

Anwers:

B, E, C, A, A, A, D, B, D