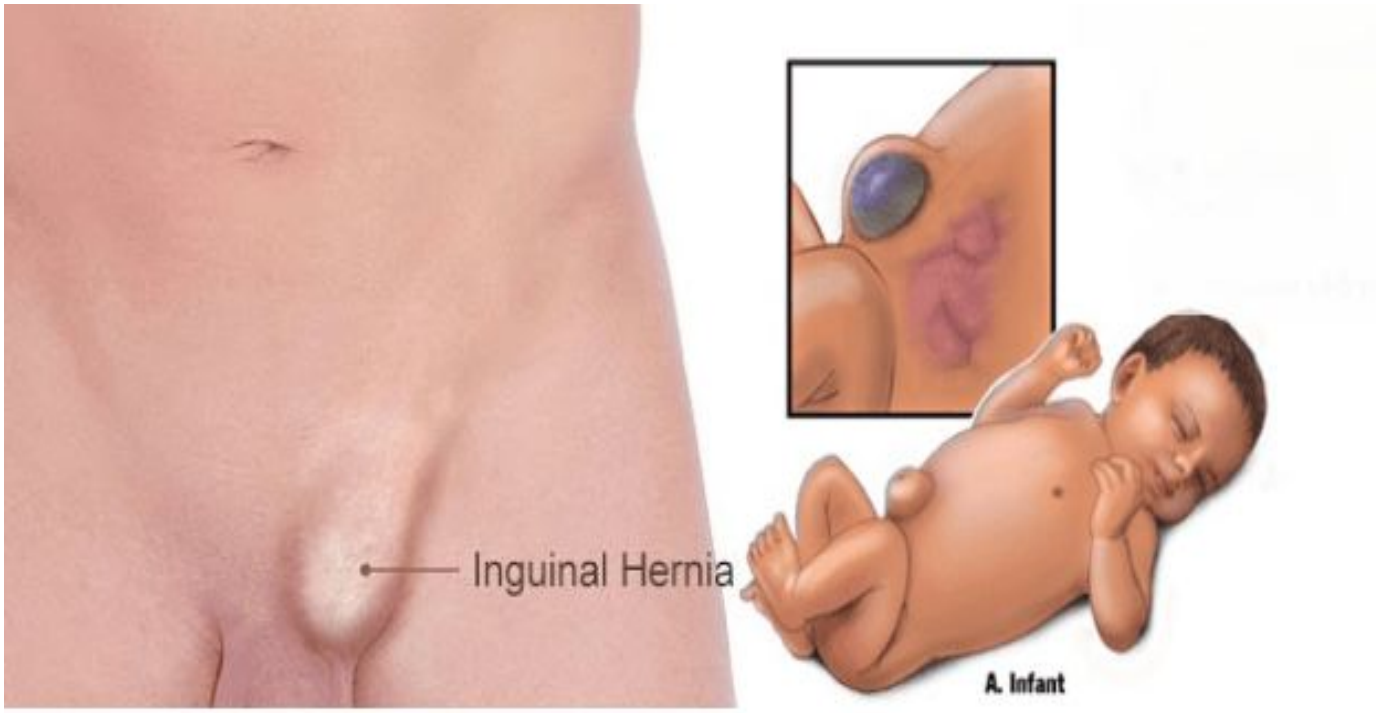

Pediatric Inguinal and Scrotal Conditions

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Objectives:
1.Introduction
2.Embryology
3.Inguinal Hernia
4.Hydrocele
5.Undescended Testis
6.Acute Scrotum

Color Index:
-Doctor's Notes -Surgery Recall -Doctor's Slides -Important -Extra+432 team

Correction File

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Introduction:

* The doctor said that the slides are enough but we added notes from surgical recall and doctor notes.

-Inguinal hernia, hydrocele and undescended testis are common groin condition in infants and children.

-They share a common embryological origin.

-They may present in isolation or combination in the same patient.

-Accurate clinical distinction is very important as the management and outcome is different in each condition.

processus vaginalis (PV):

Is outpouching of peritoneum at deep ring and extends through inguinal canal down to scrotum, associated with normal descend of testis. At 36-40 of gestation the testis reaches the scrotum and PV gradually obliterates.

Anatomy & Embryology :

• 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.

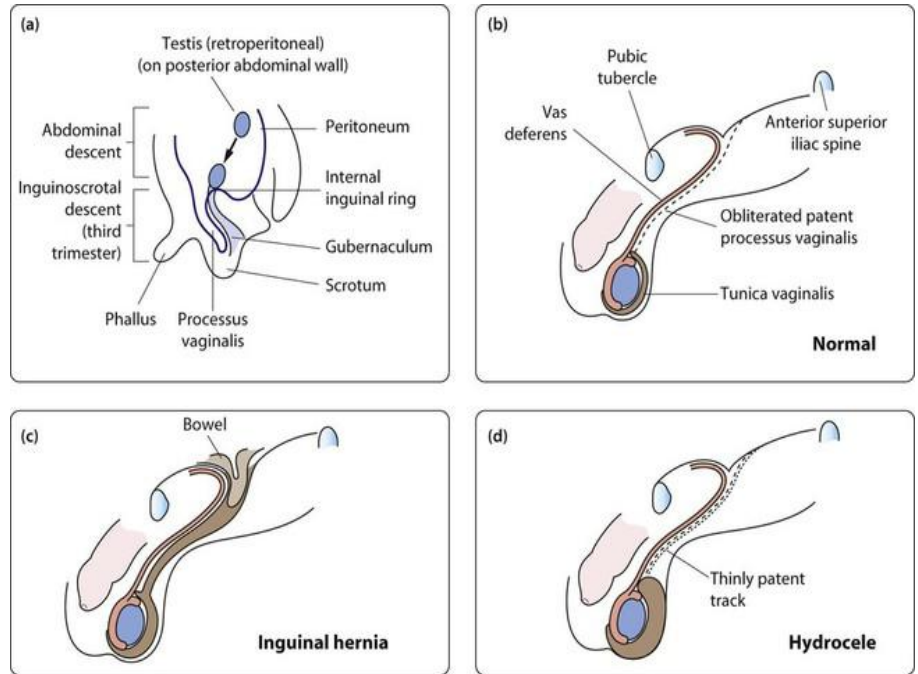
• As the testis descends at the 7th to 8th months, a portion of the processus attaches to the testis,as it exits the abdomen and is dragged into the scrotum with the testis(Guided by the Gubernaculum).

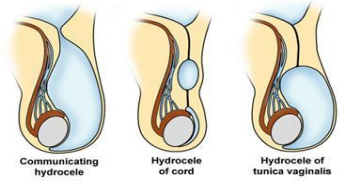
A) normal pathway for descending testes

B) when the testes reach scrotum the processus vagainalis obletrate

C) inguinal hernia

D) hydrocele



	Inguinal Hernia	Hydrocele
Definition/ Type	is an indirect hernia related to failure of closure of the patent processus vaginalis **(PPV)** at the deep inguinal ring. Intra-abdominal contents pass within a PPV, through the deep inguinal ring, inguinal canal, superficial inguinal ring and potentially into the scrotum (male) or via the canal of Nuck to the labium (female)	An abnormal collection of fluid in the process virginals which fails to obliterate resulting in swelling in the scrotum and groin. Approximately 5% of boys at term have hydrocele. Less common in girls and known as a hydrocele of the canal of nuck. **Types:** 1.Communicating Hydrocele(infantile hydrocele) Hydrocele that communicates with peritoneal cavity and, thus, gets smaller and larger as uid drains and then re accumulates 2.Hydrocele of cord (Varicocele)Abnormal dilation of the pampiniform plexus to the spermatic vein in the spermatic cord; described as a "bag of worms" 3.Hydrocele of tunica vaginalis(noncommunicating) Hydrocele that does not communicate with the peritoneal cavity; hydrocele remains the same size 
Clinical presentation	• Most hernias are asymptomatic except for intermittent inguinal bulging with straining (crying, coughing ,defecation ,etc.) • They are often found by parents . • Inguinal Pain is rare unless hernia gets complicated. • On examination, often the hernia is reduced and no bulge is seen. Provocative manoeuver such as standing , coughing, laughing or jumping are required to elicit it. • Examination should include scrotum and testes. • In girls Lump in upper part of Labia majora.	• Painless scrotal or groin swelling , but mostly scrotal. • Increase in size following viral infection. • On examination , tense , overlying skin is often has a **blue tinge. Not reducible** , transilluminate(Reflects the light from the torch; indicating the presence of fluid; not so reliable) , difficult to palpate the testis separately.

	Inguinal Hernia	Hydrocele
Management	• IH(inguinal hernia) will not resolve spontaneously and surgery is only the treatment . • **Open inguinal herniotomy (more common approach)** . • Laparoscopic herniotomy (less popular). • Preterm babies usually have their hernias repaired before discharge from nursery to avoid incarceration. • Infants and children should have their surgery done within weeks (OR availability) .	• Expectant management(observation) in the first two years of age. • By the age of 2 years 90% of hydroceles will have resolved. • Surgery (hydrocelectomy /high ligation of PPV) is indicated if the hydrocele fails to resolve by age of 2 years.
Other Info.	Incidence: -Approximately 1-5% of all children will develop IH. • Newborns incidence 3-5%. • Over all incidence in premature infants 10-30%. • Positive family history in about 10%. • More common in boys than girls (5 :1). • In boys, rt sided found in 60% ,lt sided in 30% and bilateral in 10%. • In girls , laterality is equal. Risk Factors: -prematurity. -connective tissue disorders. • ventriculo-peritoneal shunt (VP shunt). • -peritoneal dialysis(PD). • Ascites (any conditions cause increase intra-abdominal pressure). • Undescended testis. • -others	

Complicated Inguinal Hernias

The incidence range from 12-17 %.

- Younger age(below 6 months) and prematurity are risk factors
- Incarceration may be the first presenting sign of the hernia.

Clinical presentation	• As fussy infant with intermittent abdominal pain and vomiting. • A tender and sometime erythematous irreducible mass is noted in the groin.
Examination	• On examination , the infant is usually irritable, in pain, with tender groin swelling which can not be reduced with gentle pressure.
Complication	• Incarceration will result in bowel obstruction and if not treated will progress to strangulation(bowel ischemia). • Severe pain , prolonged incarceration,fever, tachycardia, and vomiting are suggestive of strangulation (rare presentation) *there are three types of Complicated Inguinal Hernias: 1.incarceration/Irreducibility 2.Obstructed hernia 3.strangulated hernia
Management	• The presence of **peritonitis or septic shock** is an absolute contraindication to attempted reduction. • Intravenous access and rehydration. • Monitored conscious sedation.(incompletely sedation ,using morphine) • Firm and (gentle) continuous pressure is applied around the incarceration. • Successful reduction is usually confirmed by sudden pop of contents back to abdominal cavity. • Over 90-95% of incarcerated IH can be successfully reduced. • Once hernia is reduced ,a delay of 24-48h is allowed before herniotomy (resolution of edema and inflammation and the risk of injury to blood vessels) • Urgent operation (Herniotomy) is necessary if reduction fails.
PIC	CONGENITAL HYDROCELE  incarceration/Irreducibility  Inguinal hernia 

UNDESCENDED TESTIS (CRYPTORCHIDISM)

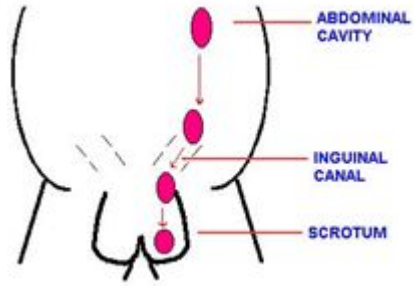
Normal Descent of testis:

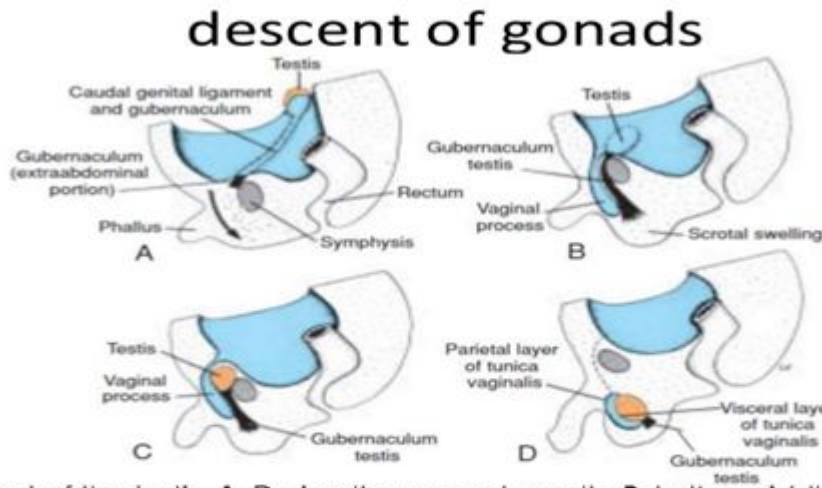
- Normal testis developed from gonadonephric ridge.
- Testicular development and descent depend on interaction among endocrine, paracrine, growth and mechanical factors(abdominal wall contract and squeeze the testis down to potential space that is deep ring).

Occur in two phases:

1- **INTERNAL DESCENT OF TESTIS:** Descent of testis from posterior abdominal wall (at the level of the kidney)→ to deep inguinal ring.(8-15 weeks of gestation) under control of anti-Mullerian hormone(AMH).

2- **EXTERNAL DESCENT OF TESTIS:** Descent of testis from deep inguinal ring, through inguinal canal,→ to scrotum(25-35 weeks of gestation) under control of androgens **(testosterone)**

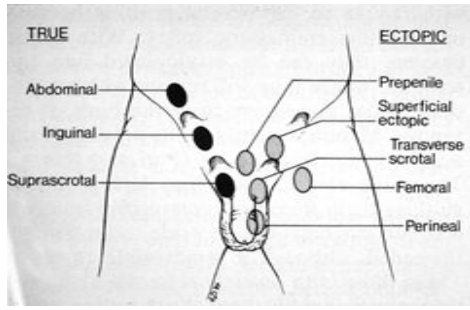




Descent of the testis. **A**. During the second month. **B**. In the middle of the third month. Peritoneum lining the coelomic cavity evaginates into the scrotal swelling,where it forms the vaginal process (tunica vaginalis). **C**. In the seventh month. **D**. Shortly after birth. *"langman Medical Embrology"*

Incidence:

-UDT occurs in approximately 1-3% of term infants and 33-45% of premature infants(whenever the premutery is extreme the highest chance to get UDT, because the testis not yet come down to the scrotum)
- Occurs on the right side in 50% , left side 35%, bilateral 10-15%.(very bad)
90% Of UDT come with hernia.

Types:	Undescended testis (UDT)	Retractile testis(very common)	Ectopic testis
Definition:	is arrested along its normal path of descent	Is a testicle that may move back and forth between the scrotum and the groin .can be manipulated into scrotum where it remains without tension Normal condition happen in 20% -30% in pediatric and disappear by the age of 5-6 no need to surgical intervention. called in Arabic " الخصية النطاطة"	is located outside of normal path of descent. Instead of going to scrotum it goes somewhere else
			
Clinical presentation	· Empty scrotum. · Absence of one or both testes. · Swelling in the groin (testis or hernia). · On examination, hemi-scrotum is underdeveloped/ hypoplastic compared to normal · **UDT clinically:** A-Testis is palpable: in the groin and fails to come down to scrotum in 80% of cases. B-Testis is impalpable /non- palpable: in the remaining 20% of cases (intra-abdominal , atrophied , or agenesis) 		

<table>
<tr><td>Diagnosis</td><td colspan="2">- Laparoscopy: The Gold Standard and its a diagnostic and a therapeutic 100% sensitive

Diagnostic laparoscopy is the preferred approach
- If testis is intra-abdominal → Lap assisted orchidopexy .
- If atrophic →inguinal exploration and excision.
- if agenesis → nothing to be done

- Radiographic imaging: <u>In non-palpable testis</u>:
US , CT, MRI but it’s not accurate</td></tr>
<tr><td rowspan="2">Management</td><td>A- Hormonal treatment (doesn’t help much)</td><td>B- Surgical treatment
(orchido=testis pexy= fixing)</td></tr>
<tr><td>The role of hormonal therapy is controversial.
LHRH and HCG are used with varying degree of success</td><td>The treatment of choice.
The best timing is between 6-12 months of age.
*We don’t do it early because the structure very small and chance to get injury is higher.
Also,We don’t do it after one or 2 year because it get insulated. the testis in scrotum is at one degree temperature less than core body temperature so if you keep it outside the scrotum at higher temperature it will get insulated and get damage and atrophied</td></tr>
</table>

Indication for surgery : (benefit of orchidopexy) order is important

- To optimize fertility.
-To potentially reduce malignancy rate (controversial) even though the percentage is very low
- To place testis in examinable position to detect malignancy early.
- To reduce risk of torsion.
- To reduce risk of trauma.
- To optimize hormonal function.
-To repair the associated hernia(90% of UDT)
-For cosmetic and psychological reasons

ACUTE SCROTUM

Acute scrotal pain with or without swelling and erythema.

· Differential diagnosis of an acute scrotum:

— **Torsion of the testis**. The most common cause of acute scrotum in children
— Torsion of the appendix testis /epididymis.
— Epididymitis / orchitis.
— Idiopathic scrotal edema (dermatitis, insect bite)
— Inguinal hernia (incarcerated).
—Trauma /sexual abuse.
— Vasculitis (Henoch-schonlein purpura).
— Cellulitis.

· Approach to acute scrotum:

Early recognition and prompt management are very important because of the possibility of testicular torsion because as the etiology with permanent damage to the testis. first ask about testicular torsion because it is the only cause that need emergency surgery

1-When taking history consider :

- Timing (time of onset and length)
- Pain character, onset and course (sudden:testicular torsion) vs gradual, constant vs intermittent: can be testicular torsion
- Location (testes, scrotum or abdomen)
- Quality (sharp, dull)
- History of trauma.

What is the classic history of testicular torsion? Acute onset of scrotal pain usually after vigorous activity or minor trauma

2- Examination:

- Overall inspection of patient and comfort level(You will find the patient very uncomfortable)
- Abdominal, inguinal, and genital exam required
- Test the cremasteric reflex first:

· **Absence of reflex**: may be most sensitive indicator of torsion of the testes.

- Begin with unaffected normal side
- Palpate testes, spermatic cord, epididymis and inguinal region.

Evaluate lie, size, masses and mobility of testis. If you can move the testis that's most likely not a torsion.

·In torsion of the testes you will find the scrotum is edematous,very tender and you can't feel the testis and the patient will not allow you

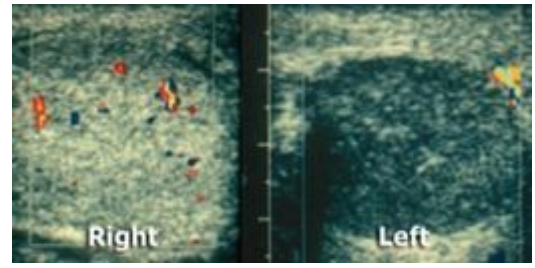
3-Investigations: Done when testicular torsion is difficult to diagnosis.

- Urine analysis.

Ultrasound the most important with color flow Doppler. (sensitivity 90% specificity 99%).

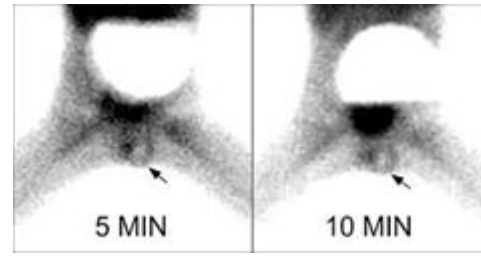
- radionuclide imaging (Sensitivity 90-100%)

the problem is time consuming but if you can do it in half an hour you do it.

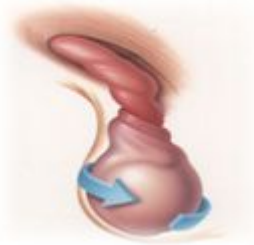


Imaging studies should not delay scrotal exploration when there is a high suspicion of torsion

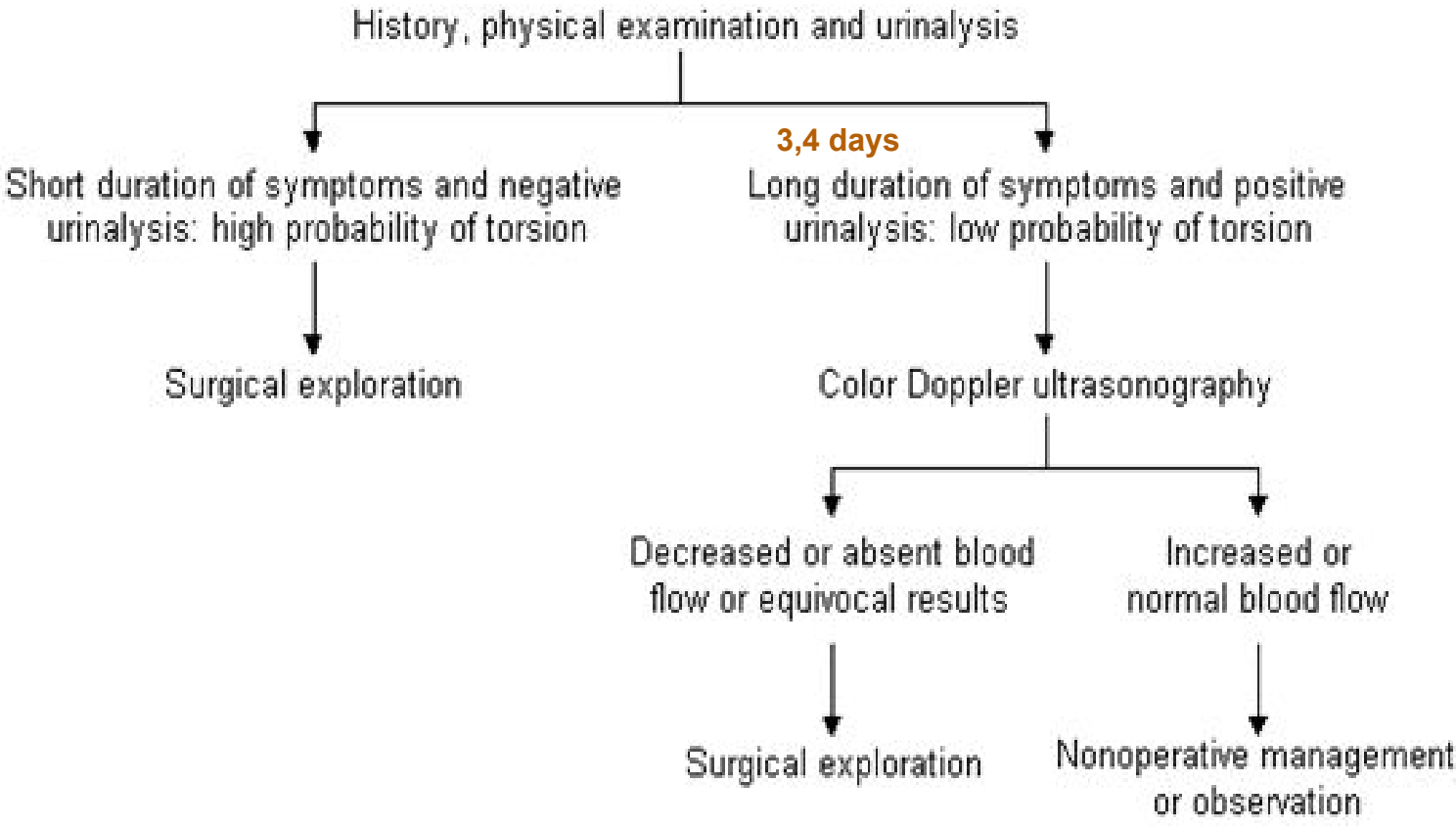
MANAGEMENT:

Testicular torsion	
Definition:	Torsion (twist) of the spermatic cord, resulting in venous outflow obstruction, and subsequent arterial occlusion S infarction of the testicle.
presentation	-The only surgical cause and the most common · Testicular torsion is a clinical diagnosis ○ Symptoms: Pain in the scrotum, suprapubic pain ○ Signs: very tender, swollen, elevated testicle;non illumination; absence of cremasteric reflex 

Continue Testicular torsion:

others	·Imaging studies usually are not necessary and ordering them may waste valuable time when the definitive treatment is surgical **·Timing is critical 4-6 H.** ·Scrotal exploration if any doubt. Take only 10 min very quick ○If testis is viable (not black not necrotic) you do untwist anticlockwise (like open book from medial to lateral) and fix both sides. To reduce the torsion in the future. ○If testis is is not viable(dead) needs excision and fix the other side. ·Two peak incidence of torsion : 1-Neonatal : the torsion happens before birth and it's not acute condition. Usually the spermatic cord get twisted called extra vaginal 2-prematurity 10-12 years here happen intravaginal .  
Non - Surgical	
EpididymoOrchitis	**antibiotics .**

Torsion of appendix testis/epididymis 	self limiting condition , if discovered before exploration can be treated conservatively give analgesia and paracetamol ,but if found at exploration needs excision. You don't have to do fixation
Idiopathic scrotal edema	Self limiting condition treated with analgesia and observation. It's allergic reaction the problem not in the testis is in the skin you can feel the testis and there is no sever pain
Traumatic orchitis 	conservative treatment



Thank you