



Pediatric inguinal and scrotal conditions

Objectives:

- Introduction.
- Embryology
- Inguinal hernia.
- Hydrocele.
- Undescended testis.
- Acute scrotum.

Resources:

- Davidson's.
- 436 doctors slides
- Surgical recall.
- 435' team work.

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COLOR INDEX:

NOTES , IMPORTANT , EXTRA , DAVIDSON'S

EDITING FILE

FEEDBACK

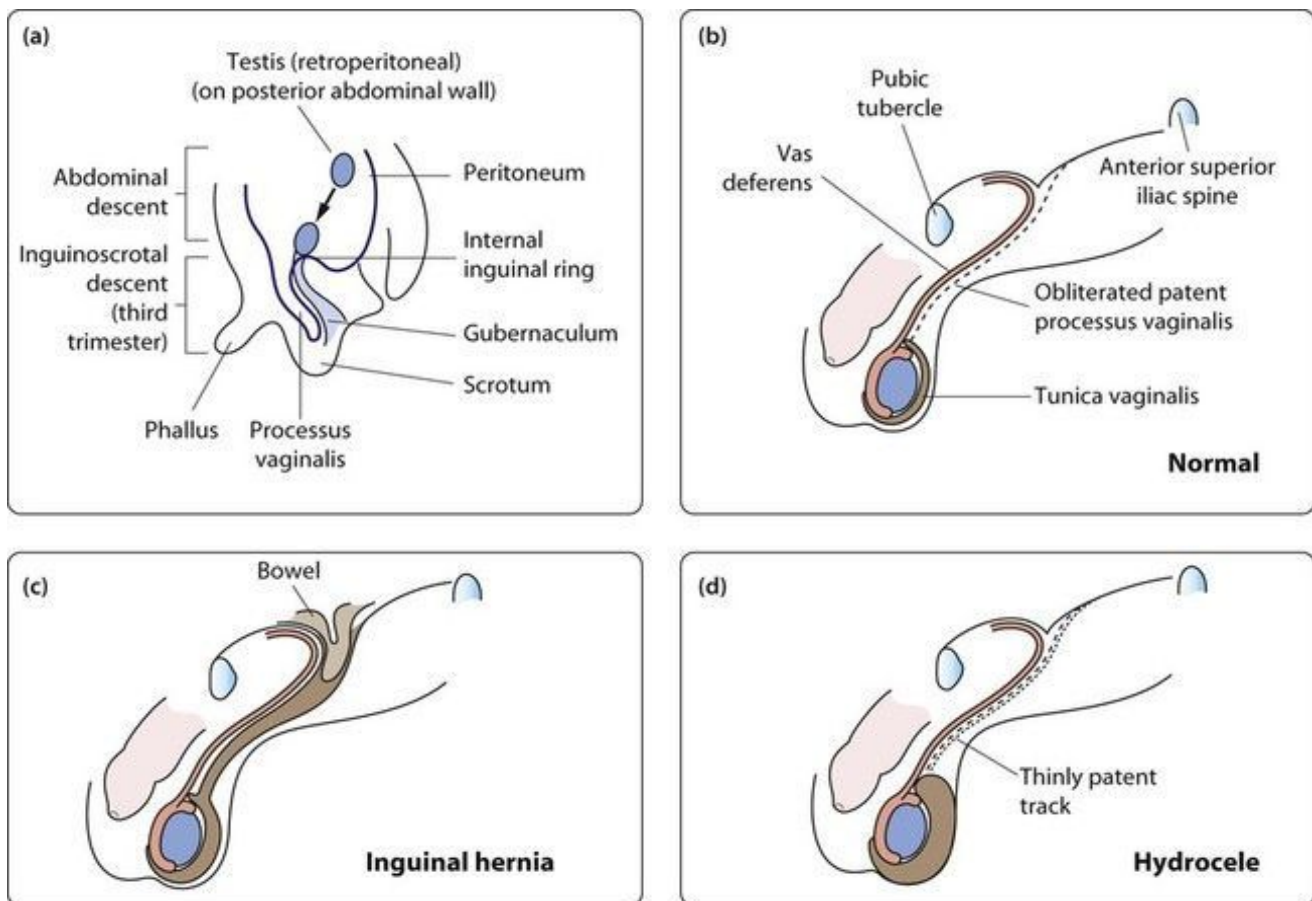
Introduction:

- Inguinal hernia, hydrocele and undescended testis are common groin conditions in infants and children.
- They share a common embryological origin.
- They may present in isolation or combination¹ in the same patient.
- Accurate clinical distinction is very important as the management and outcome is different in each condition, **and some conditions heal by themselves.**

❖ What is processus vaginalis (PV)?

It's an outpouching of peritoneum at the deep ring that extends through inguinal canal down to scrotum, associated with normal descent of testis. At 36-40 weeks of gestation the testis reaches the scrotum and PV gradually obliterates (disappears).

Embryology: [Very useful video!](#)



- What if Processus Vaginalis persists:

- Inguinal hernia (PV is **wide** allowing bowel to descend)
 - 90% of undescended testes cause hernia.
 - because undescended testes prevent PV from obliteration leading to hernia.
- Hydrocele (PV is **thin** allowing only the fluid to descend). Weakness of transversalis fascia (posteriorly).

¹ بمعنى المريض ممكن يكون عنده hydrocele بجهة والجهة الثانية undescended testis

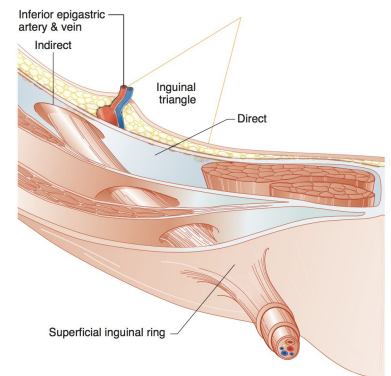
INGUINAL HERNIA (IH)

- Definition: 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 the patent processus vaginalis (PPV), through:

1. the deep inguinal ring, inguinal canal, superficial inguinal ring and potentially into the scrotum (male).
2. the canal of Neck to the labium (female). *with female we don't say inguinal canal we called it canal of Nuck.*

- **Hernia** is the protrusion of an organ or the fascia of an organ through the wall of the cavity that normally contains it.
- **Inguinal hernia:** extension of the peritoneum (and usually its contents-small intestine) through the inguinal canal.
- **It has two subtypes:**
 1. Indirect: infantile form, more common, follows the tract through the inguinal canal.
 2. Direct: adult form, usually occurs due to a defect or weakness in the transversalis fascia area hesselbach's triangle.
- *In children, 99% of groin hernias are indirect inguinal hernia, so it's not associated with muscle weakness as in adults.*



❖ Inguinal canal anatomy:

It extends from the deep inguinal ring which is the connection between peritoneal cavity and the groin to the external ring, Boundaries:

- Anterior: external oblique muscle.
- Posterior: transversalis fascia.
- Inferior wall: inguinal ligament.
- Superior ligament (roof): internal oblique and transversus abdominis.

Position of the epigastric vessels is the landmark to differentiate between direct and indirect inguinal hernia.

- The deep ring is lateral to the inferior epigastric vessels this indicates an indirect inguinal hernia.
- If it's bulged to the medial to the inferior epigastric vessels the it's direct.

● Incidence :

- Approximately 1-5% of all children will develop IH.
- Newborns incidence 3-5%
- Overall incidence in premature infants 10-30%. *More common and important (Because infants are born earlier than the closure of PV.)*
- Positive family history in about 10%.
- More common in boys than girls (5:1).
- In boys, right sided IH is found in 60% ,left sided in 30% and bilateral in 10%. *May be because the PV closes earlier in the left side.*
- In girls , laterality is equal. *50-50% chance of developing it right or left.*

• Risk Factors:

- Prematurity.
- Connective tissue disorders.
- Ventriculoperitoneal shunt (VP shunt)².
- Peritoneal dialysis (PD). Pediatric patients with chronic renal failure (because fluid accumulates in the abdomen).
- Ascites (any conditions cause increase intra-abdominal pressure).
- Undescended testis. Will have a high chance to get hernia (90%).
- Others.

• Clinical presentation:

- Most hernias are asymptomatic except for intermittent (reducible) inguinal bulging (swelling) with straining (crying, coughing, defecation, etc.)
- Inguinal pain is rare unless hernia gets complicated.
- They are often found by parents.
- On examination, often the hernia is reduced and no bulge is seen especially in children, so do provocative maneuver such as standing (to enhance the effect of gravity) ,coughing and laughing or jumping are required to elicit it and disappears when lying down.
- Examination should include scrotum and testes.
- The hernia forms a swelling in the inguinal canal, which may extend into the scrotum. (Causes hydrocele).
- The hernia often reduces spontaneously when the patient lies down, or it may be reduced by gentle pressure applied in an upward and lateral direction.
- Bowel sounds can often be heard within the hernia on auscultation. (Davidsons: 140-142)

• Complications:

1. **Incarceration /Irreducibility.** It also means obstruction. If the contents of the hernia become trapped in the weak point in the abdominal wall, the hernia cannot go back as usual.

- The incidence ranges from 12-17 %.
- Younger age (less 6 months) and prematurity are risk factors.
- Presents as fussy infant with intermittent abdominal pain and vomiting.
- A tender and sometime erythematous irreducible mass is noted in the groin.
- On examination, the infant is usually irritable, in pain, with tender groin swelling which cannot be reduced with gentle pressure.
- It may be the first presenting sign of the hernia.
- Incarceration will result in bowel obstruction and if not treated will progress to strangulation (bowel ischemia).

2. **Strangulation** it means that there is ischemia, and it's very rare in children.

- Severe pain, prolonged incarceration (can cut off blood flow to that part of intestines that is herniated) ,fever, tachycardia, and vomiting are suggestive of strangulation (rare presentation)
- It is life threatening and requires immediate surgery.

Classical scenario: The mother tells you that her baby has a bulge that comes and goes and recently the bulge didn't go and he is coming with erythematous irreducible swelling in the groin. The child is irritable, in pain, crying and vomiting, and when you examine the swelling you find it tender.

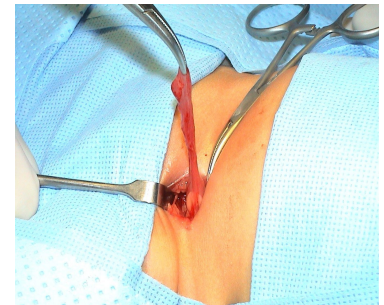


² **Ventriculoperitoneal** is a surgical procedure that primarily treats a condition called hydrocephalus. This condition occurs when excess cerebrospinal fluid (CSF) collects in the brain's ventricles.

- **Management:** if its regular uncomplicated hernia, the management is surgery ASAP.

Uncomplicated IH	Incarcerated IH
<ul style="list-style-type: none"> ● IH will not resolve spontaneously & surgery is the only treatment. ● Open inguinal herniotomy (more common approach). ● Laparoscopic herniotomy (less popular) ● Preterm babies usually have their hernias repaired <u>before discharge</u> from nursery to avoid incarceration because they have higher chance. ● Infants & children less than 6 months should have their surgery done within weeks (OR availability). 	<ul style="list-style-type: none"> ● The presence of peritonitis or septic shock is an absolute contraindication to attempted reduction. Because septic shock means that the bowel is already dead and you don't reduce dead tissues. ● If the patient does not have septic shock, intravenous access and rehydration are initiated. Along with monitored conscious sedation (with Morphine or Pethidine). ● Firm and 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 & inflammation). ● Urgent operation (Herniotomy) is necessary if reduction fails. Pt. could develop ischemia (ischemic bowel) if not treated immediately.

- **Pictures of inguinal hernia:**



CONGENITAL HYDROCELE

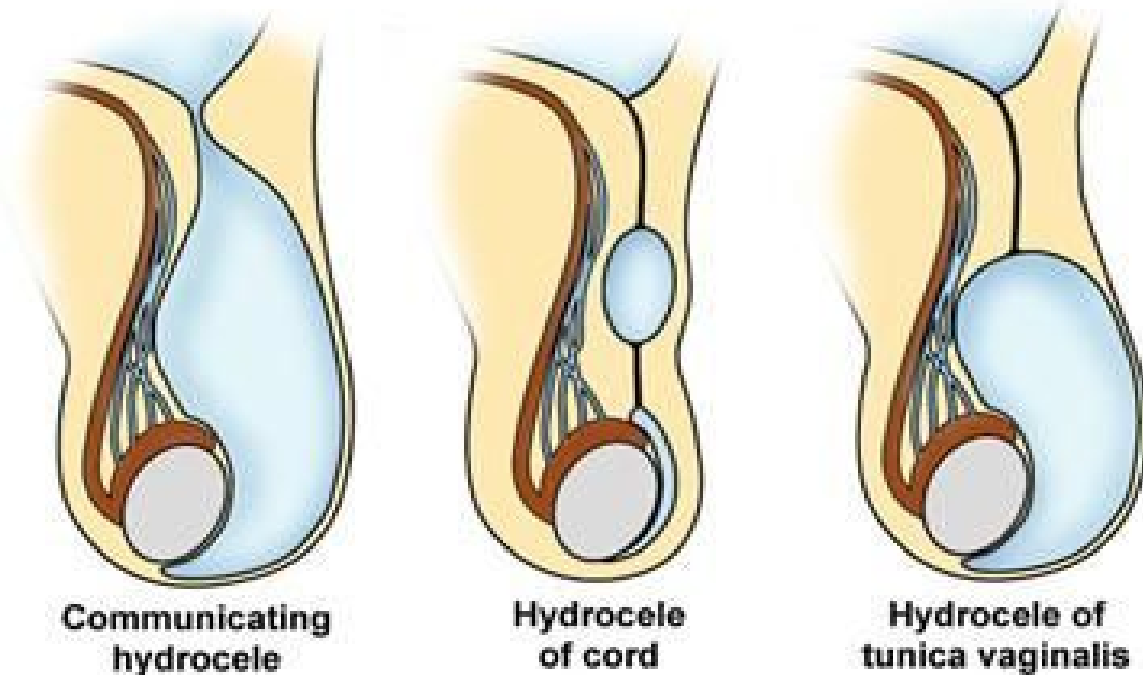
Its an abnormal collection of fluid in the processus virginals which fails to obliterate resulting in swelling in the scrotum and groin. **The processus vaginalis fails to obliterate but it's very small (like a tube)**

- Differs from adult hydrocele which is more likely due to infection (epididymo-orchitis, TB), malignancy or idiopathic.
- Approximately 5% of boys have hydrocele at term.
- Less common in girls and known as a hydrocele of the canal of nuck.
- If the abdominal end of the PV remains open but " too small " to permit herniation of intestines, peritoneal fluid passes into patent processus vaginalis forming a hydrocele of the testis.

❖ Types of Hydrocele:

1. **Communicating hydrocele the most common type (90%):** the fluid flows back and forth between the scrotum and the abdomen (you can squeeze the fluid back to the peritoneum cavity).
2. **Non-communicating hydrocele** or Hydrocele of tunica vaginalis : the fluid stays around the testicles.
3. **Hydrocele of the spermatic cord:** the fluid is located in the spermatic cord between the scrotum and the abdomen. **Mimics inguinal hernia, how do we differentiate between them? Irritability and reducibility! Ultrasound is usually done if we're not sure with the diagnosis**

الهيرنيا لو ضغطنا عليها بترجع مكانها الطبيعي ويصير مافيه شي، بس الهيدروسيل مايرجع طيب ممكن يجي ببالكم: الهيرنيا إذا كانت incarcerated ماراح ترجع! كيف نفرق؟ في هذه الحالة بتكون الهيرنيا مؤلمة جداً بس الهيدروسيل لا. وكذلك الهيرنيا ممتدة للقروين مب بس في السكروتم!



❖ Clinical presentation:

- Classical history of communicating hydrocele: when he wakes up, the scrotum is empty. Then during the day it becomes full with fluid. (because it goes back by gravity while sleeping)
 - **Painless scrotal** or groin swelling, but mostly scrotal.
 - The clinical presentation will help you to differentiate hydrocele from incarcerated hernia. Swelling is confined to the scrotum, unlike hernia which is up to the groin.
 - In hydrocele the child **not irritable or in pain**.
 - Increase in size following viral infection
- On examination, scrotal swelling, tense, overlying skin often has a blue tinge. **Not reducible**, transilluminate, **difficult to palpate the testis separately**.
 - It's more likely to be associated with an inguinal hernia.
 - If there is any doubt about the diagnosis, then ultrasound should be performed.
 - It is important always to seek this physical sign and also to examine the neck of the scrotum carefully to exclude an inguinal hernia as the cause of the swelling. ([Davidsons:422](#))



❖ Management:

- Expectant management (observation) in the first two years of age.
- By the age of 2 years 90% of hydrocele will have resolved (fluid is absorbed).
- Surgery (hydrocelectomy (non-communicating hydrocele) /high ligation (communicating hydrocele) of PPV) is indicated if the hydrocele fails to resolve by age of 2 years.
- Aspiration alone does not cure an idiopathic hydrocoele and the tunica soon refills. It is possible to obliterate the sac by injecting a sclerosant after aspiration, but surgical excision and eversion is associated with a much lower recurrence rate.
- if the hydrocoele fluid becomes infected, incision and drainage of the pus is necessary. Similarly, a hematocele may require treatment by incision and drainage. [Davidsons \(454\)](#).

UNDESCENDED TESTIS (CRYPTORCHIDISM)

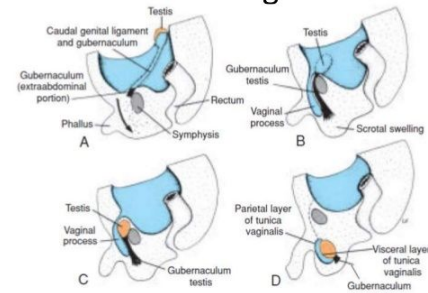
Embryology	<ul style="list-style-type: none">● Normal testes develop in the posterior abdominal wall from gonado-nephric ridge (testes and kidney come from the same structure, testes descend and kidneys ascend).● Normal pathway for descending: abdominal wall > deep inguinal ring > inguinal canal > superficial inguinal ring > scrotum.● Normal testes descend across the abdomen to deep inguinal ring between 8-15 weeks of gestation under control of AMH (anti-mullerian hormone) so one month before birth the testis must be down in the scrotum.● Second phase of descent, the testes move through the inguinal canal into the scrotum (25-35 weeks of gestation) under control of androgens (testosterone).● Testicular development and descent depend on interaction among endocrine, paracrine, growth and mechanical factors (anterior and posterior abdominal walls muscles contract against each other and squeeze testes down through the opened deep ring). This explanation come from children with Prune belly syndrome³, they have bilateral undescended testes.<ul style="list-style-type: none">○ What make testis goes down? We don't know the exact reason, it's multifactorial.● The gubernaculum⁴ guides the descent of the gonads.
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³ Congenital absence of the abdominal muscles

⁴ Fibrous band

- In males:
 - The upper part of the gubernaculum degenerates.
 - The lower part persists as the gubernaculum testis ("scrotal ligament"). This ligament secures the testis to the most inferior portion of the scrotum, tethering it in place and limiting the degree to which the testis can move within the scrotum.
- In females:
 - The gubernaculum has two vestigial remnants in females, the ovarian ligament and the round ligament of the uterus (ligamentum teres uteri) which respectively serve to support the ovaries and uterus in the pelvis.

descent of gonads



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'

Terminology

★ **Undescended testis (UDT):** the testis is arrested along its normal path of descent.

- In abdomen = abdominal testis, In inguinal canal = canalicular testis.

★ **Retractile testes** (normal physiological phenomenon in 20% of pediatric): 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. (very common up to 20% of pediatric population due to strong cremasteric reflex, it persists up to age of 5 - 6 years then it resolves by itself - the cremasteric reflex weakens-). The testis may atrophy due to changes in the temperature, so we need to follow him up. Clinically: **the mother says sometimes I see the testis and sometimes I don't, and this is how we differentiate it from undescended testis (not seen at all).**

★ **Ectopic testis (rare):** is located outside of normal path of descent (it already pass through normal channel, but does not go to the scrotum).

It can go to the perineum (under the scrotum) or root of penis, medial aspect of thigh, the most common site: superficial inguinal pouch (above the superficial inguinal ring).

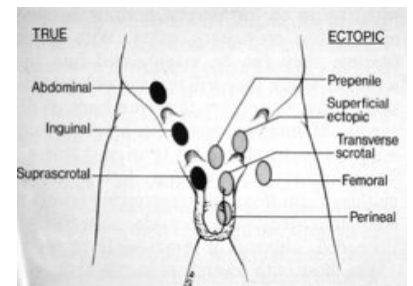
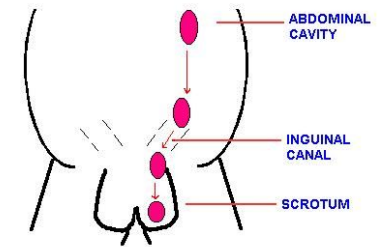
(Davidson's p:421)

Retractile testis:



Normally, both testes are in the scrotum by 6 months of age. However, they may be excessively mobile and readily retract towards the external inguinal ring, even into the inguinal canal, especially when the patient is examined in a cold room. Such retractile testes may easily be misdiagnosed as being incompletely descended. Care must be taken to examine the baby in a warm room or after a bath. True undescended testes are of two types:

1. Incomplete: Such a testis is arrested in its normal pathway to the scrotum. Usually this is within the inguinal canal, more rarely within the abdomen.

2. Ectopic: An ectopic testis has developed normally, but after passing through the external inguinal ring its further descent is impeded. It either remains in the superficial inguinal pouch (common) or is transposed to perineal, femoral or prepubic sites (rare).





<p>Incidence:</p>	<ul style="list-style-type: none"> • UDT occurs in approximately 1-3% of term infants and 33-45% of premature infants. • Occurs on the <u>right side</u> in 50% , left 35%, bilateral 10-15%.
<p>Clinical presentation</p>	<ul style="list-style-type: none"> • Empty scrotum. • Absence of one or both testes. • Swelling in the groin (testis or hernia). • On examination, <u>hemi-scrotum is underdeveloped/hypoplastic</u>⁵. • Testis is palpable in the groin (<u>inguinal canal</u>) and fails to come down to scrotum in 80% of cases. • Testis is impalpable/non-palpable in the remaining 20% of cases (intra-abdominal ,atrophied⁶ or agenesis). <u>If we say the testis is impalpable, we mean that we searched in all the areas that could have ectopic testis.</u> 
<p>Management</p>	<p>→ Hormonal treatment: <u>useless, and if you want to give hormones you only give it to a patient below 6 months old.</u></p> <ul style="list-style-type: none"> ◆ The role of hormonal therapy is controversial. ◆ LHRH⁷ and HCG⁸ are used with varying degrees of success. <p>→ Surgical treatment (orchidopexy)⁹ <u>the treatment of choice.</u></p> <ul style="list-style-type: none"> • <u>The best timing is between 6-12 months of age (because before 6 ms (Technical surgical problems) the tiny structures might be damaged during surgery and not after 12ms b/c the testes might be damaged under high temperature of inguinal canal > cause infertility and hormonal deficiency).</u> • Palpable unilateral or bilateral → orchidopexy. • Impalpable/ nonpalpable: <ul style="list-style-type: none"> ○ Radiographic imaging (US,CT,MRI) <u>not accurate.</u> is rarely helpful in locating nonpalpable testis. ○ <u>Diagnostic laparoscopy</u> (the best diagnostic and therapeutic method) is the preferred approach <ul style="list-style-type: none"> -If testis is intra-abdominal → Laparoscopic assisted orchidopexy. -If atrophic (<u>vanishing testis</u>)→ inguinal exploration and excision. <p><u>During laparoscopic procedure, there is one thing that indicates atrophy of testis > presence of <u>blood vessels</u> and vas deferens.</u></p> <p>-if agenesis→ nothing to be done (<u>only vas deferens is present</u>)</p> <p>◆ Indication for surgery: (benefit of orchidopexy)¹⁰</p> <ul style="list-style-type: none"> ✓ <u>To optimize fertility (the most important one).</u> if you leave it --> it will atrophy ✓ To potentially reduce malignancy rate (controversial) ✓ <u>To place testis in examinable position to detect malignancy early.</u> 

⁵ Not stretched.

⁷ Luteinizing hormone releasing hormone.

⁸ Human chorionic gonadotropin.

⁶ نزلت لكن صار لها torsion والبيبي لسا في بطن أمه وماتت.



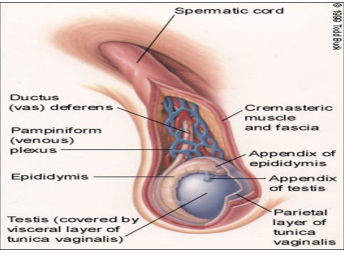
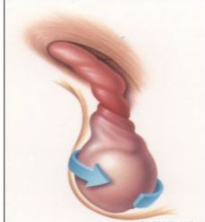

⁹ "تثبيت الخصية" Orchido=testicle Pexy=fixation

¹⁰ Only the first point is important for us and for the patient, the other points are not always evident!



- ✓ To reduce risk of torsion.
- ✓ To reduce risk of trauma.
- ✓ To optimize hormonal function.
 - The Testis has two functions: fertility and hormone production from leydig cell which is testosterone.
- ✓ To repair the associated hernia (90% of UDT).
- ✓ For cosmetic and psychological reasons.

ACUTE SCROTUM

Definition	<p>Acute scrotal pain with or <u>without swelling and erythema.</u></p> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;"> <p>Acute scrotum</p>  </div>  </div>
Anatomy	<p>Anatomy of the normal (right) testis and spermatic cord. Note the appendix of the testis.</p> 
DDx of an acute scrotum	<ul style="list-style-type: none"> ● Torsion of the testis. (The most common cause and the only surgical indication) <p>Davidson's:(p:421) Torsion of the cord can occur where the visceral layer of the tunica vaginalis completely covers the testis so that it lies suspended within the parietal layer. The patient, usually a teenager, presents with sudden onset of testicular pain and swelling. There may be a history of minor trauma, or previous episodes of pain due to partial torsion. On examination there is a red, swollen hemiscrotum that is usually too tender to palpate.</p> <p>Misdiagnosis of the swelling as epididymo-orchitis, which is rare in teenagers, is a serious error. Torsion of the testis is a surgical emergency; if the blood supply is not restored within 12 hours, the testis infarcts and must then be excised. If at operation the testis is found to be viable, it is sutured to the parietal tunica to prevent recurrence.As the underlying abnormality of the tunica is bilateral, the other testis must be fixed at the same time.</p> <div style="display: flex; align-items: center; margin-top: 10px;">   </div> <p>The other causes are not surgical, you can treat it medically:</p> <ul style="list-style-type: none"> ● Torsion of the appendix testis/epididymis. ● Epididymitis / orchitis. These 1st three can mimic each other and it's very hard to differentiate between them. ● Idiopathic scrotal edema (dermatitis, insect bite)



	<ul style="list-style-type: none"> ● Inguinal hernia (incarcerated). ● Trauma/sexual abuse. ● Vasculitis (Henoch-schonlein purpura¹¹). ● Cellulitis. ● Others.
<p>Approach to acute scrotum:</p>	<p>- Early recognition and prompt management are very important (within 6 hours). Because of the possibility of testicular torsion, as the etiology, to cause permanent damage to the testis.</p> <p>→ History :</p> <ul style="list-style-type: none"> ◆ Timing (time of onset and length) ◆ Pain character, onset and course (sudden vs gradual, constant vs intermittent) <ul style="list-style-type: none"> ● Torsion > sudden\short length , epididymo-orchitis > gradual ◆ Location (testes, scrotum or abdomen), NOT radiation to these sites (as in renal colic) the pain has to be originally from these sites. ◆ Quality (sharp, dull) ◆ History of trauma. <p>→ Examination:</p> <ul style="list-style-type: none"> ◆ Overall inspection of patient and comfort level. RED, SWOLLEN, SEVERELY TENDER. ◆ Abdominal, inguinal, and genital exam required ◆ Test the cremasteric reflex first: not evident clinically in testicular torsion, because it's a very painful condition. <ul style="list-style-type: none"> ● Absence of reflex may be most sensitive indicator of torsion of the testes ◆ Begin with the unaffected side ◆ Palpate testes, spermatic cord, epididymis and inguinal region. ◆ Evaluate the lie, size, masses and mobility of testis. ◆ In physical examination you may not feel the testis as a different organ, because everything is edematous and inflamed, if you can feel it and move it, it's not testicular torsion. <p>→ Investigations: make sure the investigation should be done within half an hour, any investigation take more than hour you shouldn't consider it at all.</p> <ul style="list-style-type: none"> ◆ Done when testicular torsion is difficult to diagnosis. ◆ Urine analysis. (to exclude UTI (if present > epididymo-orchitis) ◆ US with color flow Doppler. (sensitivity 90% specificity 99%). ◆ Radio-nuclear¹² imaging (Sensitivity 90-100%) more accurate. <p>★ Imaging studies should not delay scrotal exploration when there is high suspicion of torsion.</p>
<p>Management</p>	<p>★ Testicular torsion: (the only surgical cause):</p> <ul style="list-style-type: none"> ○ Testicular torsion is a clinical diagnosis. ○ 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.

¹¹ An autoimmune disease that affects blood vessels.

¹² Takes time, black represents normal blood supply, white represents lack of blood supply. [PICTURE](#)



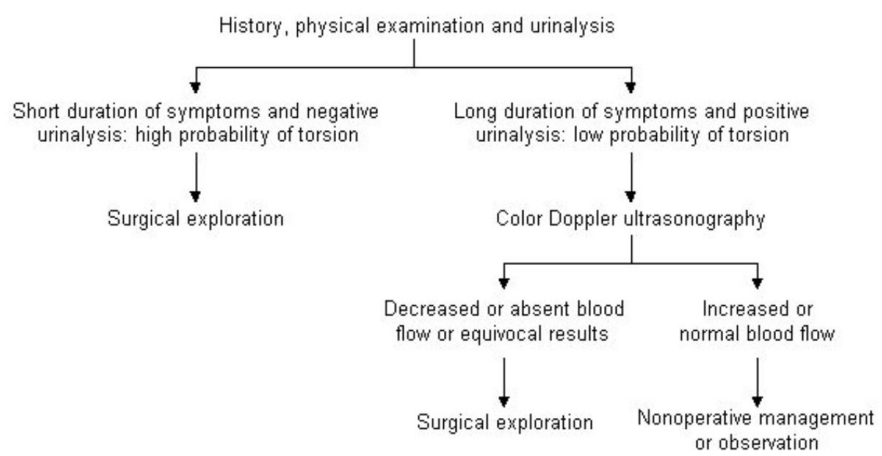
- Scrotal exploration if any doubt.
- If testis is viable untwist anticlockwise¹³ (medial to lateral) and fix both sides. 50% chance to have a torsion in the other testis.
- **If a testis is not viable, excision and fixing the other side is needed.**
- **Fixing contralateral testis to reduce the torsion in the future.**

★ **Other causes:**(non-surgical)

- Epididymo-Orchitis: Antibiotics.
- Torsion of appendix testis¹⁴/epididymis :self limiting condition , if discovered before exploration can be treated conservatively (analgesics) ,but if found at exploration needs excision.
- Idiopathic scrotal edema: Self limiting condition treated with analgesia and observation. Edema of the skin, not related to the testis.
- Traumatic orchitis: conservative treatment. (you can see Bruises)



Protocol for the diagnosis and treatment of the acute scrotum:



Recall: EXTRA

What is hernia?

(L. rupture) Protrusion of a peritoneal sac through a musculoaponeurotic barrier (e.g., abdominal wall); a fascial defect.

Why should hernia be repaired:

To avoid complications of incarceration/ strangulation, bowel necrosis, SBO, pain.

What is incarcerated hernia?

Swollen or fixed within the hernia sac (incarcerated = imprisoned); may cause intestinal obstruction (i.e., an irreducible hernia).

Differences between complete and incomplete hernia?

Complete: Hernia sac and its contents protrude all the way through the defect.

Incomplete: Defect present without sac or contents protruding completely through it.

What is hydrocele?

Clear fluid in the processus vaginalis membrane.

What is communicating hydrocele?

Hydrocele that communicates with peritoneal cavity and, thus, gets smaller and larger as uid drains and then re-accumulates.

What is noncommunicating hydrocele?

Hydrocele that does not communicate with the peritoneal cavity; hydrocele remains the same size.

¹³ Why anti-clockwise? Because the torsion happens clockwise.

¹⁴ Severe pain mistaken by testicular torsion

Summary

	Inguinal Hernia	Hydrocele
Definition	is an indirect hernia related to failure of closure of the patent processus vaginalis at the deep inguinal ring. (PV is wide).	It is an abnormal collection of fluid in the processus vaginalis which fails to obliterate resulting in swelling in the scrotum and groin. (PV is thin).
Types	—————	1-Communicating hydrocele (most common) 2-Non-communicating hydrocele 3. Hydrocele of the spermatic cord
Clinical presentation	<ul style="list-style-type: none"> - Painless unless it gets complicated. - Swelling in <u>groin</u>. - Reducible. - On Examination: 1-Swelling in the inguinal canal. 2-Hernia is bulging with (standing, coughing, laughing and jumping). 3- Disappears when lying down. 	<ul style="list-style-type: none"> - Painless. - Swelling in <u>scrotum</u>. - Not reducible. - On Examination: (Scrotal swelling, tense, overlying skin has blue tinge, transilluminate and difficult to palpate the testis separately).
Management	<ul style="list-style-type: none"> - Uncomplicated: open inguinal herniotomy. - Complicated: if there is no (peritonitis or septic shock) we try to <u>reduce</u> hernia by: <ol style="list-style-type: none"> 1- rehydration . 2-sedation (morphine or pethidine). 3- continuous pressure is applied around the incarceration. - if hernia is reduced: a <u>delay of 24-48h</u> is allowed before herniotomy (resolution of edema and inflammation). - if reduction fails: Urgent operation (Herniotomy). 	<ul style="list-style-type: none"> - Observation in the <u>first two years</u>. - if the <u>hydrocele fails</u> to resolve by age of 2 years: surgery (hydrocelectomy /high ligation).

Undescended testis (cryptorchidism)

Definition	the testis is arrested along its normal path of descent.
Clinical presentation	<ul style="list-style-type: none"> - Empty scrotum. - Absence of one or both testes. - Swelling in the groin maybe (testis or hernia). - On examination: 1- hemi-scrotum is underdeveloped/hypoplastic. 2- in 80% of the cases testis is palpable in the groin and fails to come down to scrotum 3- in 20% of the cases Testis is impalpable/non-palpable in the remaining (intra-abdominal ,atrophied or agenesis)
-The best diagnostic and therapeutic method is Diagnostic laparoscopy .	
Management	<ul style="list-style-type: none"> - Hormonal treatment: <u>useless</u> (if you want give only give patient <u>below 6M</u>). - Surgical treatment (orchidopexy): the treatment of choice. the best timing is <u>between 6-12 months</u> of age.
Indication of surgery (benefit of orchidopexy)	To optimize fertility

Acute scrotum

Definition	Acute scrotal <u>pain</u> with or without <u>swelling</u> and <u>erythema</u> .
Torsion of the testis is the most common cause of acute scrotum and <u>the only surgical indication</u> .	
Clinical presentation	Torsion pain: (sudden -hours - local – sever). On examination: - Abdominal, inguinal, and genital exam required. - Test the cremasteric reflex first: <u>Absence of reflex</u> may be most sensitive indicator.
Investigations:	<ul style="list-style-type: none"> - Urine analysis. - US with color flow Doppler. - Radio-nuclear imaging : (more accurate).
Management	- Scrotal exploration: If testis is viable <u>untwist anticlockwise</u> (medial to lateral) and <u>fix</u> both sides.



Questions

1- 13 Y/O boy comes to ER with painful right scrotal swelling. It was gradual in onset over the last 5 days. He gave history of dysuria & suprapubic pain (for the last 2 weeks) . What is the common cause ?

- a) Hydrocele b) Testicular torsion c) Epididymitis

(ANS: C)

2) an 11 month/old boy born prematurely was brought to the clinic by his parents because his testes were not in the scrotum. His mother said that it descended during sleep, but it goes up again when she pulls it down. Which of the followings is/are true?

- a) There is scrotal hypoplasia
b) It is due to cremasteric reflex
c) Orchidopexy is the treatment of choice
d) All of the above.

(ANS: b)

3)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

(ANS: d)

4) The first symptoms of strangulated Inguinal Hernia is:

- a. Vomiting
b. Fever
c. Constipation
d. Pain

(ANS: d)

5) 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

(ANS: d)

6)Which one of the following clinical feature helps to differentiate Between inguinal hernia and hydrocele in children?

- a)Reducibility b)Scrotal swelling c)Tenderness

(ANS: a)