Abdominal Wall, Umbilical & Other Hernias

Objectives

The student is expected to describe and explain the different types, surgical anatomy, predisposing factors, clinical features and the complications of the following)

- Groin hernias (**inguinal** and **femoral**)
- Other hernias (**umbilical**, paraumbilical, epigastric, divarication, incisional, obturator, Spigelian, perineal and lumber)
- Abdominal wall (hematoma, tumours)
- Umbilicus (fistulae, granuloma, adenoma, omphalitis, secondary deposits, endometrioma, and discoloration)

Tutorial titles

1. **Abdominal wall disorders**
   - Hematoma
   - Tumors
2. **Groin Hernias**
   - Inguinal (Direct, Indirect)
   - Femoral
3. **Other Hernias**
   - Umbilical, paraumbilical, epigastric, divarication, incisional, obturator, Spigelian, perineal and lumber
4. **Umbilicus**
   - Fistulae, granuloma, adenoma, omphalitis, secondary deposits, endometrioma, and discoloration

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- Doctor's Notes (438)
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Summary File

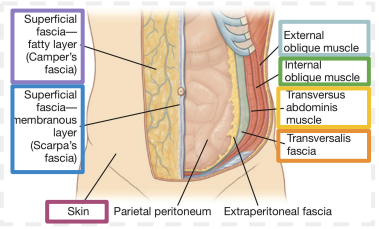
Editing File

Anatomy of The Abdomen (dr's slides)

The anterior abdominal wall extends from the xiphoid process and costal margins cranially to the pubic and iliac bones inferiorly and to the mid-axillary lines on either side.

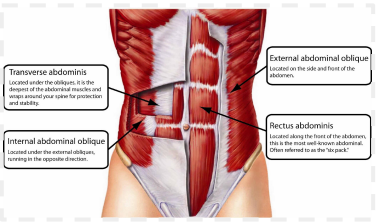
1- Components of the abdominal wall :-

- **Layers** (from external to internal):
  - **Skin**
  - Superficial fascia
  - **Superficial fatty layer (Camper fascia)**
  - **Deep membranous layer (Scarpa fascia)**
  - **External oblique muscle**
  - **Internal Oblique Muscle**
  - **Transversus abdominis muscle**
  - **Transversalis fascia**



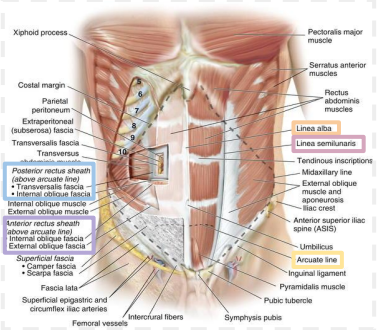
- **Muscles**:

- Single **Anterior** muscle:
  - Rectus abdominis
  - Pyramidalis (absent in 10-25% of the population)



- 3 **Lateral** muscles
  - External oblique
  - Internal oblique
  - Transversus Abdominis

- **Linea Alba:** separates left rectus abdominis from right rectus abdominis
- **Linea semilunar**: lies between anterior muscle and lateral muscles
- **Arcuate line:** In the middle of the abdomen we have the umbilicus and it is 3-6 cm below the umbilicus.



<u>Above arcuate line</u>

- **Posterior rectus sheath:**
  - Present above, absent below arcuate line. **(most important fact)**
  - Transversus abdominis aponeurosis passes posterior to the rectus muscle to form the posterior rectus sheath.
- **Anterior rectus sheath:**
  - Formed by External oblique aponeurosis always
- **Internal Oblique muscle aponeurosis** contributes to both the anterior and posterior rectus sheaths

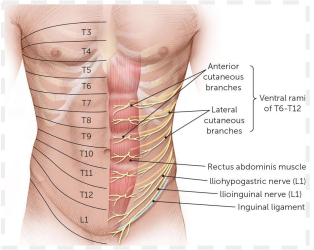
<u>Below arcuate line</u>

- Internal oblique and transversus abdominis aponeurosis:
  - anterior to the rectus muscle.
- Rectus abdominis muscles are nearly fused with the transversalis fascia.
- This distinction is important in the laparoscopic approach to inguinal hernia repair.

Innervation and blood supply of anterior abdomen: (you are supposed to remember these from your anatomy lecture)

Nerves:

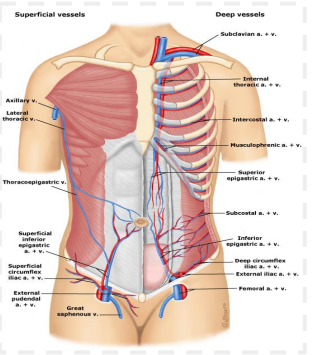
Major nerves to the anterolateral abdominal wall include the thoracoabdominal, lateral cutaneous, subcostal, iliohypogastric, and ilioinguinal nerves. They enter subcutaneous tissue to become the anterior cutaneous branches of the skin in the anterior abdominal wall.
The majority of these nerves innervate the muscles of the anterolateral wall, as well as the skin overlying.
This ilioinguinal nerve is commonly encountered during open inguinal hernia repairs as it overlays the inguinal canal and, if severed, could cause loss of sensation in the inguinal region, mons pubis, medial thigh, and the anterior scrotum or labia majora.



Nerves supply

Arteries:

Superior part of the anterolateral abdominal wall: supplied by musculophrenic artery
Skin near the midline:supplied by superior & inferior epigastric arteries
Skin of the flanks: supplied by intercostal arteries & lumbar arteries & deep circumflex iliac arteries
Inferior part of the wall: supplied by superficial epigastric artery and superficial circumflex iliac artery



Vascular supply

Veins:

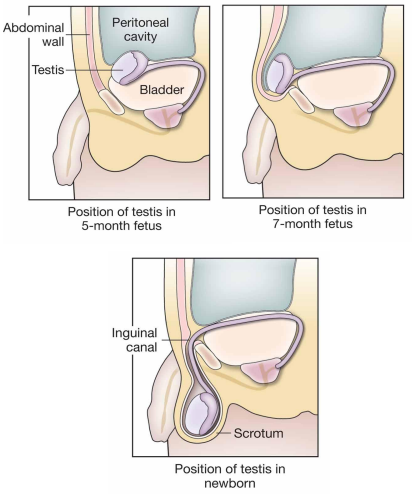
Superior part of the anterolateral abdominal wall: drained by musculophrenic vein
Skin near the midline: drained by superior & inferior epigastric veins
Skin of the flanks: drained by intercostal vein & deep circumflex iliac veins
Inferior part of the wall: drained by superficial epigastric vein and superficial circumflex iliac vein

Embryology of The Abdomen

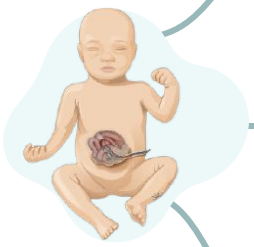
Embryology is not part of our objectives, but Dr.Bishr mentioned it.

Testicular descendant

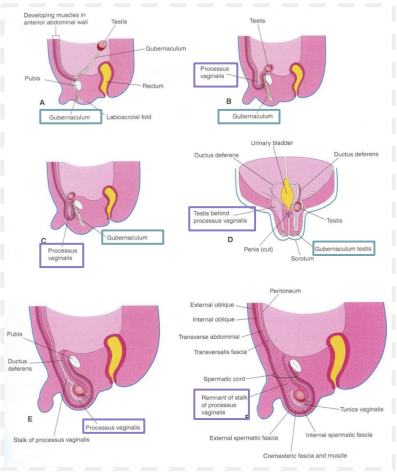
- The ovaries and testes develop in the abdomen and descend to their adult anatomical positions before birth.
- By the end of the 2nd month, gonads and mesonephros are attached to posterior abdominal wall. **(Dr. Bishr slides)**
- Mesonephros deteriorates into the ligamentous Gubernaculum. **(Dr. Bishr slides)**
- The internal descent begin at the 12th week
- First the testes (in case of male) gets attached to the Green tube , **Gubernaculum** and before it goes down it gets preceded by **Processus vaginalis**
- When it goes down it takes its vascular innervation and nerves with it.
- First it goes **through the inguinal ligament** and it pierces the deep ring and it's facia then it pierces the superficial ring and it's facia.
- When it finally settles down in the scrotum it will be covered by these 2 fascia and the processus vaginalis, total of three covering.



Complete descent of testis is associated by

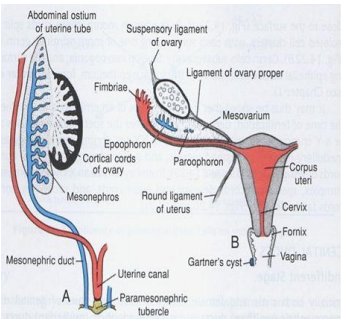


1. Degeneration of **gubernaculum**. **"to prevent herniation"**
2. Obliteration of stalk of **processus vaginalis.**
3. Persistence of part of processus vaginalis surrounding the testis in the scrotum to form "tunica vaginalis"



Descent of the ovary (Dr. Bishr slides)

- Descend to just below pelvic brim
- Gubernaculum form, but is rudimentary
- Gubernaculum or caudal genital ligament becomes the round ligament of the uterus and passes through the inguinal canal to the labia majora
- Processus vaginalis normally obliterates completely



1- Rectus Muscle Disorders

Desmoid Tumor

Extra Picture

Figure 1: Abdominal mass at physical examination.

- Rare benign tumor. Can progress to be malignant fibrosarcoma
- Thought to arise from fibrous intramuscular septa in the lower rectus abdominis muscle.
- The tumors originate from fiber-producing connective tissue, are characterized by local and aggressive tumor growth, and do not metastasize.
- **Treatment involves radical surgical resection** because it's refractory to chemotherapy and radiotherapy.
- It does not change in size when the abdominal muscles are contracted.
- Associated with Gardner's syndrome.
- Most common in women of child-bearing age.

Rectus sheath Hematoma

Extra Picture

- A painful swelling within the rectus sheath arises from the disruption of a branches of the superior or inferior epigastric arteries.
- This condition is rare, but may represent an unusual presentation of acute abdominal pain
- Trauma is the most common cause of hematoma

Risk factors

Elderly patient

Anticoagulants (major risk factor)

How to correct it? Give fresh plasma and vitamin K which will reverse the anticoagulants effect

Excessive physical exertion

Pregnancy

Vigorous coughing (steroids)

Types

Acute

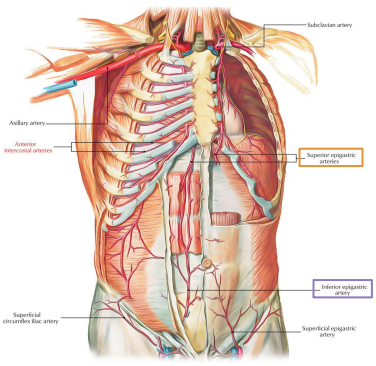
(in elderly after violent cough, especially in those on steroids)

A- Rupture of **inferior epigastric artery:**

- presents with **tender mass in right or left iliac fossa and with overlying bruise.**

B- Rupture of **superior epigastric artery:**

- presents with **upper abdominal tenderness and a bruise below the costal margin.**



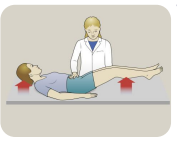
Chronic

- Presents as non tender upper abdominal mass
- The swelling will be firm to hard, and without a definite edge because it is deep seated.

1- Rectus Muscle Disorders

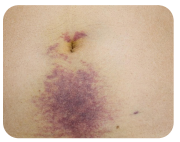
Clinical features

- **Carnett sign** (useful for differentiating abdominal wall pain from intra-abdominal pain).
  - The patient is in the supine position and the investigator identifies the point of **maximal abdominal pain** by deeply palpating with a finger; the patient is then asked to tense the abdominal muscles while the fingertip is released, followed again by deep palpation.
  - **Positive** if both stages (before and after muscle contraction) are **painful**. In contrast, pain originating from the abdominal organs is associated with just a pain in the first stage.

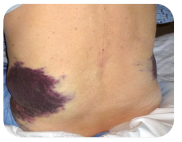


Carnett's sign

- **Fothergill sign** (useful for differentiating abdominal wall mass from intra-abdominal mass).
  - The patient is asked to lie in the supine position and contract the abdominal muscles, e.g., by lifting the head or lower limbs
  - **Positive** if the palpable abdominal **mass does not cross the midline** and remains palpable after contraction of the rectus abdominis muscles



Cullen sign

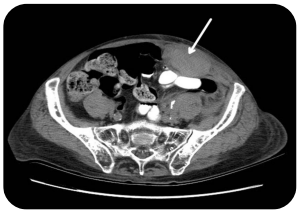


Grey Turner sign

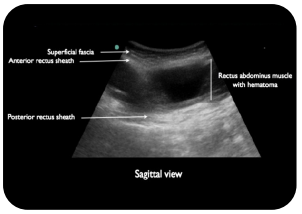
- **Cullen sign** (periumbilical ecchymosis)
- **Grey Turner sign** (flank ecchymosis)
- **Signs of hypovolemic shock** (e.g., tachycardia, hypotension) due to Inability to tamponade the bleeding from the artery.

Diagnosis

1. Serial measurement of **hematocrit and/or hemoglobin levels**; anemia and/or leukocytosis may be present.
2. **CT scan (more accurate)**
3. **Abdominal ultrasound:** can be used to confirm the diagnosis.



CT: Left Rectus Sheath Hematoma



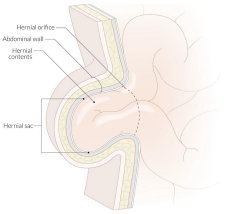
Abdominal US: Rectus Sheath Hematoma

Treatment

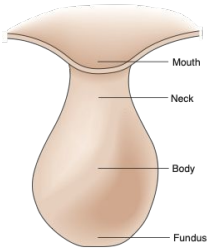
Conservative	Hemodynamically unstable patients with expanding hematoma
• Rest • Analgesics (Morphine) • Compression of the hematoma • Correction of abnormal coagulation • IV fluid resuscitation and/or blood transfusion	• Angiography with arterial embolization • Surgical evacuation of the hematoma and ligation of the artery

Hernias (In general)

- **Hernia** Derived from Latin word for rupture
- An abnormal protrusion of an organ or tissue through a defect in its surrounding walls.
- Hernias can be considered as a disease of collagen metabolism. Collagen I/III ratio is important.
- In summary: weak areas are caused by stretching or surgical incisions in association with a defect in collagen metabolism.

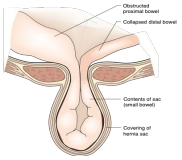


★Hernia Parts



- Hernia **neck** Located at the innermost musculoaponeurotic layer whereas the hernia **sac** is lined by peritoneum and protrudes from the neck. If a patient comes one week after surgery with a "hernia" and there is no sac. then this dehiscence (separation of surgical sutures) and it's not a hernia
- No consistent relationship between the area of a hernia defect and the size of a hernia sac
  - In physical examination, we don't care how large the "sac" is. We must palpate the hernia and push it centrally to estimate its "defect" size.

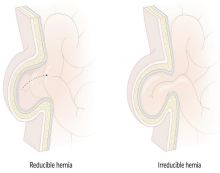
Hernia Contents

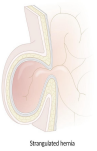


- A hernia may contain any intra abdominal structure, but most commonly contains omentum and/or small bowel.
- A hernia is an abnormal protrusion of a cavity's contents through a weakness in the wall of the cavity, **but takes with it all the linings of the cavity** "To form its wall"

Terminology

- **Reducible Hernia :** when intraabdominal contents can easily move in and out the lump site to the abdominal wall
- **Incarceration :** Irreducible Hernia when contents can not be returned to the abdominal wall cavity due to adhesions or edema. Its painless or slight discomfort, no tenderness nor skin changes
- **Obstruction:** irreducible hernia when contents can not be returned to the abdominal wall cavity
- **Strangulation :** Irreducible hernia with compromised blood supply "Gangrene", Usually due to occluded Vein then complicate to artery. Will be very painful, red and **skin changes** which differentiate between it and obstructed hernia. Strangulated hernia is a medical emergency needs immediate surgery.





History

- If the lump is painless (most likely) or painful.
- Symptoms of bowel obstruction (constipation, vomiting)
- Lower urinary tract symptoms (straining, hesitancy)
- Cough
- Lifting heavy objects
- Smoking

Examination

- Reducibility: if the lump reduces spontaneously or when it is pushed. (strangulated and incarcerated hernias can not be reduced)
- Tenderness
- Skin changes
- Examination of contralateral side
- In indirect hernia check the scrotum.

Hernias (In general)

Etiology (Unified theory) Not part of the objectives

- Traditionally thought of a weakness of the transversalis fascia which is a thin aponeurotic membrane of the abdomen. It lies between the inner surface of the transverse abdominal muscle and the parietal peritoneum.
- Evolving evidence points to multifactorial evidence
- **(I doubt you will be asked about these theories, but at least understand it)**

Anatomy

- 20% of males will have a patent processus vaginalis in adulthood (But <50% will develop a hernia).
- Weakness of the posterior Inguinal wall is due to the degeneration of the fibers, muscles, and aponeuroses of the transversus abdominis and internal oblique.
- Collagen framework of the transversals fasciae appears to be modified in patients with direct hernias.

Biochemistry

- Smooth muscle activity within the tunica vaginalis must undergo atrophy and apoptosis for it to seal; this system is dependent on sympathetic nervous system and androgens.
- Chemical mediators which interfere with fibrinogenesis contribute to hernia formation.

Smoking

- smoking likely globally affects collagen formation/degradation/modification.

Collagen

- Type III collagen is not a sufficient barrier and may dispose a patient herniation, **as opposed to Type I.**
- Decrease in Type I or increase in Type III collagen has been linked to herniation.

Enzymatic Pathology

- Increase levels of elastase and metalloproteinases, and decreases levels of metalloproteinase inhibitors are associated with hernia formation.

Proteases

- Cellular Mediators.
- Collagen quality is affected by the protease-anti-protease balance.
- Imbalance of proteases and antiproteases may contribute to collagen synthesis.

Genetics

- Connective tissue disorders, Hypermotility, Congenital hip dislocation, are all associated with hernia formation.

Summary

- "Hernia disease" is multifactorial in etiology
  - Final common pathway seems to be the collagen matrix.
  - Many details and the exact pathway remain unclear.
  - Investigation are ongoing.

Risk groups

- Intraabdominal high pressures from **constipation**, prostatic symptoms, excessive coughing & lifting, peritoneal dialysis.
  - However, it has been shown that hernia is no more common in Olympic weightlifter than in general population, suggesting that high pressure is not a major factor causing hernia.
  - Many patients will first notice hernia after excessive straining.
- **Pregnancy** due to hormonally induced laxity of pelvic ligaments.
- **Elderly** due to degenerative weakness of muscles and fibrous tissue.
- Hernia is more common in **smokers** because it affects collagen formation/degradation/modification.
- A recent Swedish report has shown that inguinal hernia is less common in obese patient with hernia risk being negatively related to BMI contrary to widespread belied.

Groin Hernias

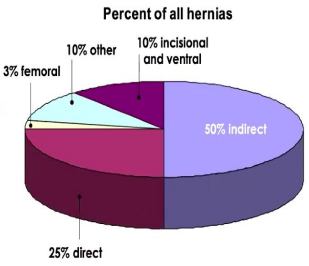
Background

- **Groin hernias are divided into (Inguinal & Femoral).**
- **"These are important facts you need to remember" you have to consider which type is more common in each gender.**
- (Femoral commonly occur in females more than males but still indirect inguinal hernia is considered the most common in both genders, Inguinal commonly occur in males "Indirect in children". Don't get confused when asked about this part)
  - You can use these gender and age groups as tips if asked to determine the type of hernia in the MCQs.
- Indirect inguinal is the most common in both males and females.
- Direct hernias are very **uncommon** in women.
- Indirect inguinal and femoral hernias are more **common** on the **right side.**
  - Attributed to a delay in atrophy of the processus vaginalis following the normal slower descent of the right testis to the scrotum during fetal growth; tamponading effect of the sigmoid colon on the left femoral canal

Types

Inguinal Hernias

- **25M:1F For groin hernias**
- Prevalence of hernias increases with age, as does likelihood of **strangulation**
- Strangulation occurs in 1% to 3% of groin hernias
- 75% of all abdominal wall hernias occur in inguinal region
  - 2/3 (50%) are indirect, 1/3 (25%) direct

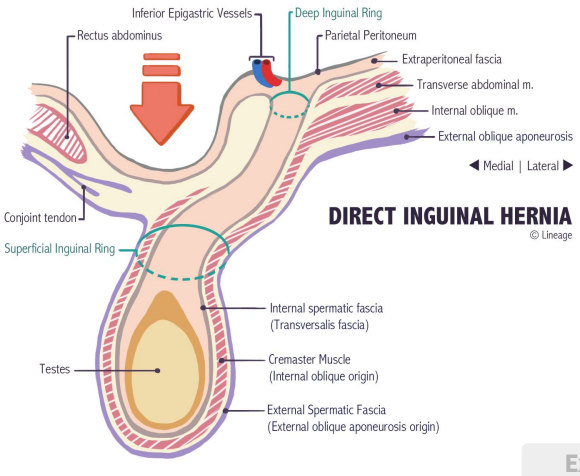


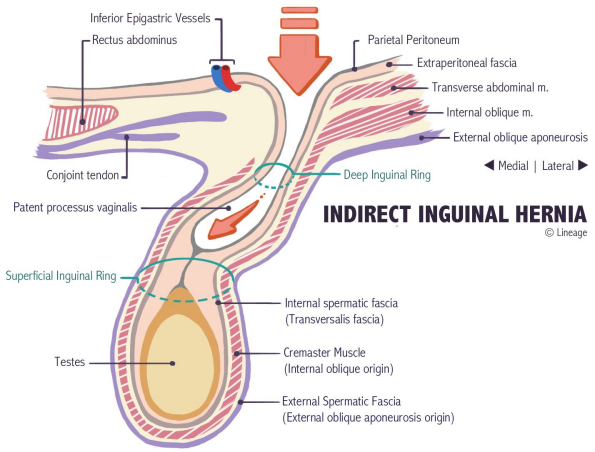
Femoral Hernias

- 5% of all hernias are femoral
- Other hernias represent 20%
- F:M is 10:1 for femoral hernias
- 10% of F and 50% of M who have a femoral hernias either have or will develop an inguinal hernia
- Femoral hernias have the **highest rate** of strangulation (15% to 20%) of all hernias

Inguinal Hernia Types

Will be discussed in details in the next slides





Extra Pictures

Direct Inguinal

Herniated part pushes skin directly

Indirect

Herniated part pushes Inguinal canal contents, which indirectly pushes the underlying skin

2- Groin hernias (Inguinal)

Surgical Anatomy

Reference Picture

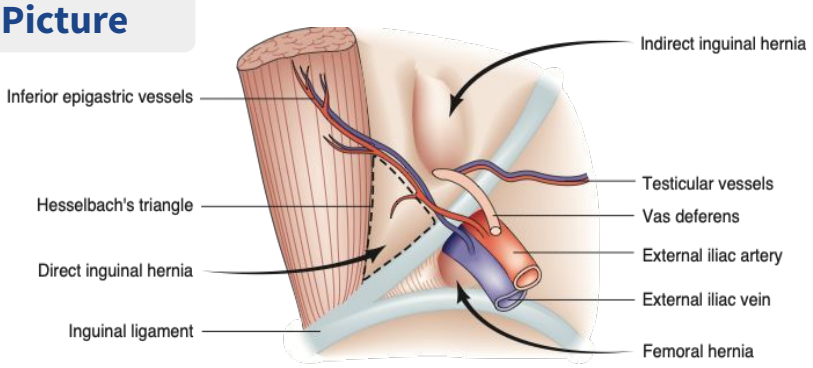
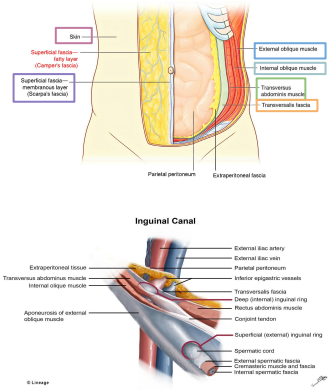


Fig. 11.3 Anatomy of the internal inguinal ring, showing sites of herniation from within.

Abdominal wall

Formed of (from external to internal):

- Skin
- Soft tissue (Scarpa's fascia)
- ★ External oblique muscle
- ★ Internal Oblique Muscle
- ★ Transversus abdominis muscle
- Transversalis fascia

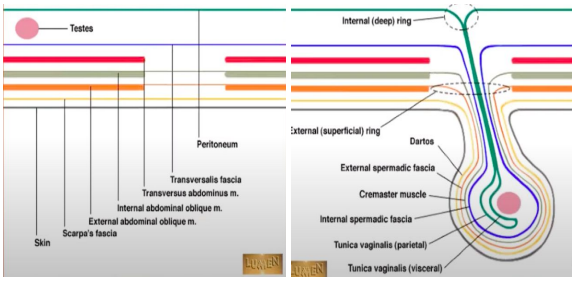


Inguinal Canal

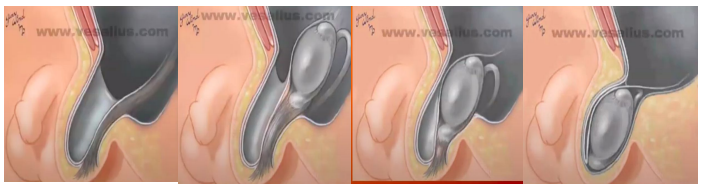
- The canal that contains spermatic cord (males) or round ligament (Females) & Processus Vaginalis
- Have deep (Internal) & Superficial (External) rings
- Passes Above inguinal ligament, lateral to inferior epigastric arteries
- Will be discussed in details in next slide

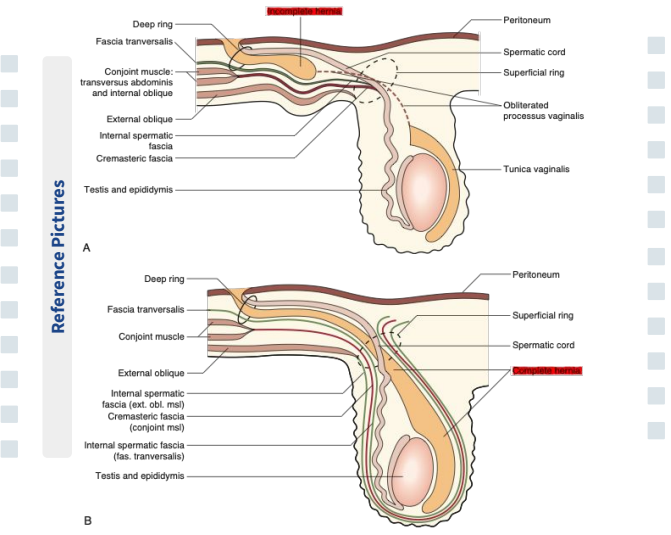
Testicular descendant

- After descendant
  - Scarpa's gives dartos fascia
  - Transversus doesn't contribute
  - Internal oblique forms the cremaster muscle
  - External oblique forms the external spermatic fascia
  - (in females, the ovaries don't descend as the testicles in males, this is why inguinal hernias are more common in males)



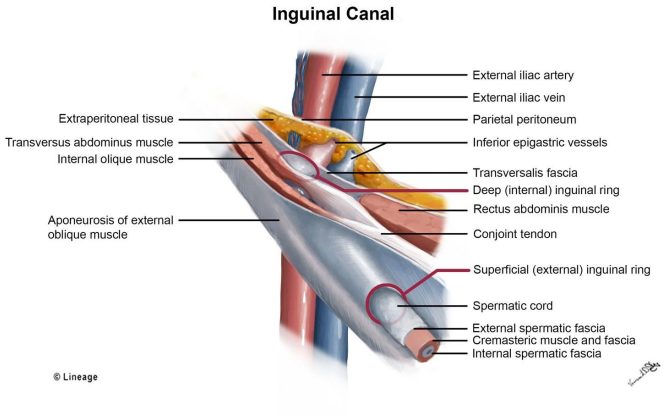
Sequence from Dr.Bisher slides

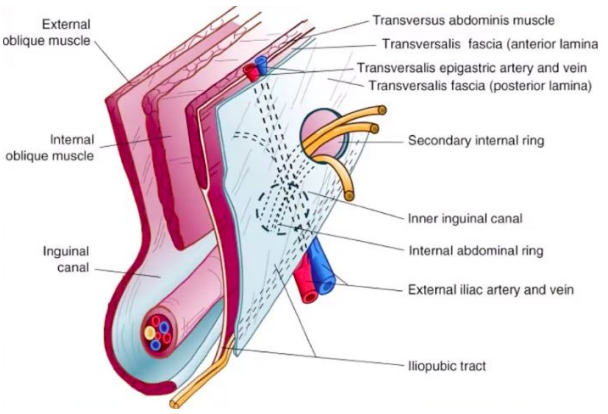




2- Groin hernias (Inguinal)

Surgical Anatomy of Inguinal canal





- 4 cm oblique passage in the lower anterior abdominal wall, lies just above inguinal ligament
- Bounded by the deep and superficial inguinal rings, and the four walls
  - The internal **(deep) inguinal ring** is an opening in the transversalis fascia
    - Bounded medially by **Inferior epigastric** artery **Important landmark to differentiate between direct and indirect hernia**
  - The inguinal canal ends at the external (**superficial) inguinal ring,** which is an opening in the aponeurosis of the external oblique muscle

Contents of Inguinal canal

Dr. Bishr: Important to know them

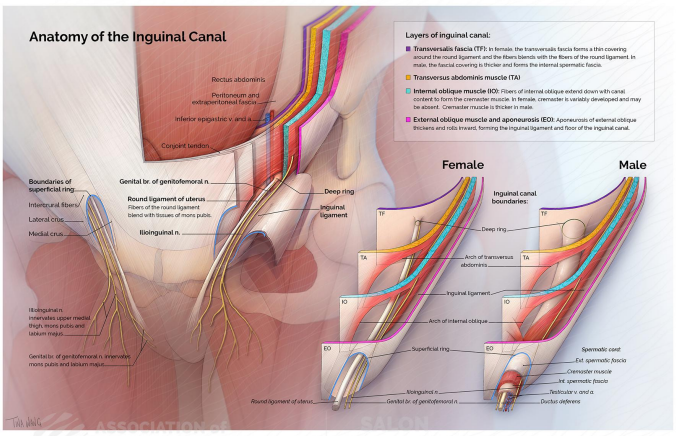
Males: Rule of **three**

- Three layers of fascia:
  - **External** spermatic fascia.
  - **Middle** spermatic fascia. (Cremasteric)
  - **Internal** spermatic fascia.
- Three arteries:
  - **Cremasteric** artery.
  - **Testicular** artery.
  - Artery of the **vas deferens.**
- Three Nerves:
  - **Ilioinguinal**,
  - Genital branch of **genitofemoral**
  - **Sympathetic** fibers to vas and testes
- Three veins:
  - **Pampiniform** plexus.
  - **External spermatic** vein.
  - **Deferential** vein.
- Three other things:
  - **Vas deferens**
  - **Lymphatics of the testis & vas**
  - **Cremaster Muscle**

Females: Rule of **two**

- Two main things:
  - **Fat pad**
  - **Round ligament**
- Two vessels:
  - **Artery to round ligament**
  - **Vein of the round ligament**
- Two nerves:
  - **Ilioinguinal**
  - **Genital branch of genitofemoral**

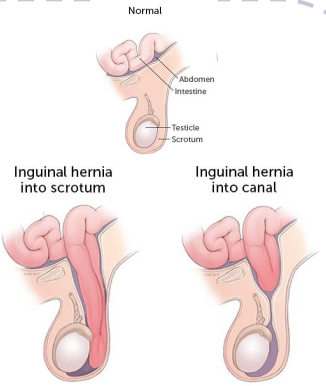
Extra Picture



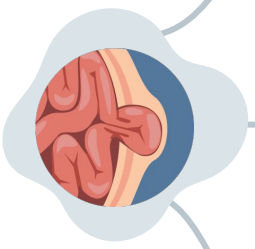
2- Groin hernias (Inguinal)

Indirect Inguinal Hernia

- The **most common** Hernia for both sexes
- **Predisposing factors are**: Persistence of a **patent processus vaginalis** which is the primary causative factor i**n pediatric population**; in adults, the case is likely multifactorial.
- An indirect inguinal hernia enters the internal (deep) inguinal ring and descends **within the coverings of the spermatic cord** so that it can pass into the scrotum, the so-called inguino-scrotal hernia.
- It enters the inguinal canal. So, it will protrude above inguinal ligament, and **lateral to the inferior epigastric artery,** this protrusion may remain in the inguinal region, or extend **by passing above the inguinal ligament** to the scrotum.



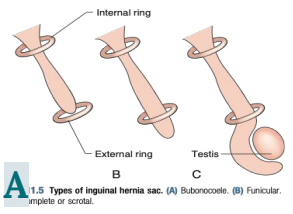
Clinical Features



1. - May remain asymptomatic with some dragging or discomfort in the groin during lifting or straining or at the end of the day.
   - Relieved by rest.
2. - It is unusual for a patient to present with a lump without a pain.
3. - In adults it Develops over months to years.
   - More common in children, spontaneous resolution **during the first year of life**.
   - Once the child begins to walk its resolution less likely.

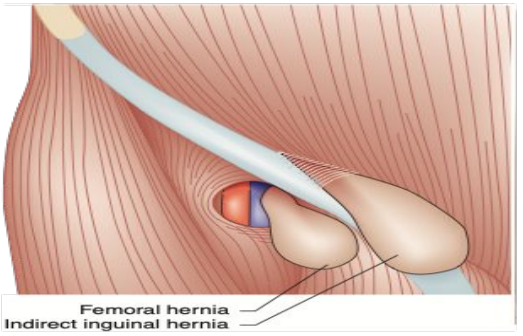
Signs of the hernia

- Figure (A), Picture (A) Bubonocele:
  - Hernia forms a swelling in the inguinal region (Appearing as a bulge)
- Figure (A), Picture (C) Hernia extended into the scrotum
  - passes above and medial to the pubic tubercle (Landmark of inguinal ligament), in contrast to a femoral hernia, which bulges below and lateral to the tubercle (Figure B)
- Clearly visible when patient **stands**, or asked to **cough,** and reduces when **lying down**
- **Cough impulse:** palpate the patient and ask the patient to cough, if you feel something hitting your hand then its positive and highly diagnostic of hernias
- If you couldn't find a protrusion, look for asymmetry (Bilateral hernia is uncommon, and if present they wouldn't be symmetrical)
- If you also couldn't (Like in obese patients), try to palpate the cough impulse



1.5 Types of inguinal hernia sac. (A) Bubonocele. (B) Funicular. mplete or scrotal.

C 1.7 Clinical photograph of bilateral inguinal hernia.



Reference Pictures

★ 2- Groin hernias (Inguinal)

Direct Inguinal Hernia

Predisposing factors

- Due to **weakness of the abdominal wall** (hesselbach's triangle).
- precipitated by increases in intra-abdominal pressure
  - Other common causes of hernia
  - Weakness is usually bilateral

Association with indirect hernia

★ The neck of the sac of a **direct** inguinal hernia **lies medial** to the inferior epigastric vessels, whereas that of an **indirect hernia lies lateral** to them. (Very important MCQ)

- A combined indirect and direct hernia may occur on the same side (**pantaloon (بنطلون) or saddle-bag hernia**), with sacs straddling the inferior epigastric vessels.

Hesselbach's Triangle

Once Again ;)

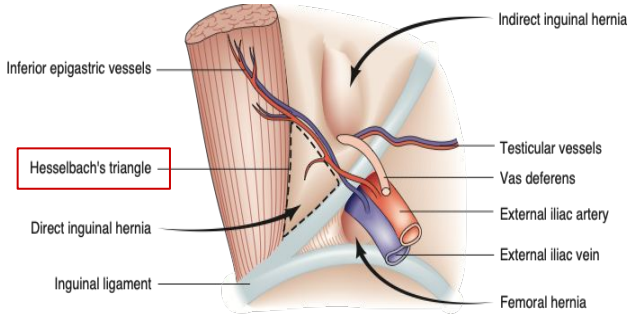
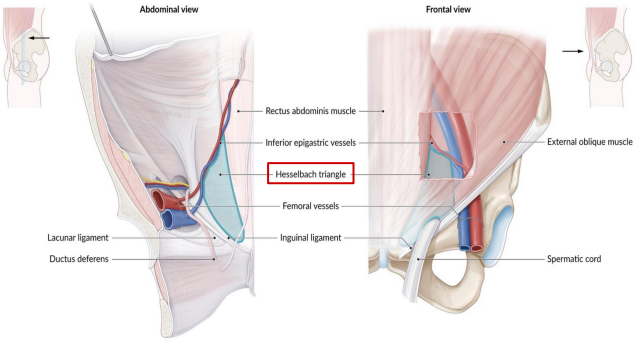
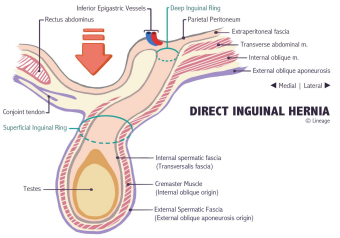


Fig. 11.3 Anatomy of the internal inguinal ring, showing sites of herniation from within.



- A direct hernia is a weakness of the inguinal **floor**.
- Pushes the **transversalis fascia** -which is void of muscle- to protrude.
- It lies between **Inferior epigastric vessels** (Superolateral), **Lateral border of rectus abdominis muscle** (Medial) and **inguinal ligament** (Inferolateral)
  - These boundaries mark the area known as **Hesselbach's triangle.**



Clinical Feature

01

- The hernia forms a bulge in the medial side of inguinal canal.
- **reduced by backward pressure,** and the edges of the defect may then be palpable.

- it is often difficult to distinguish between the direct and indirect hernias
- "deep ring occlusion test" may aid in differentiating, but it is unreliable test. Often the final differentiation made on the operating table.

02

- The hernia occasionally bulges through the external (superficial) inguinal ring, but the transversalis fascia cannot stretch sufficiently to allow it to descend down into the scrotum (Direct hernias never extend to scrotum) Does not go through with the spermatic cord

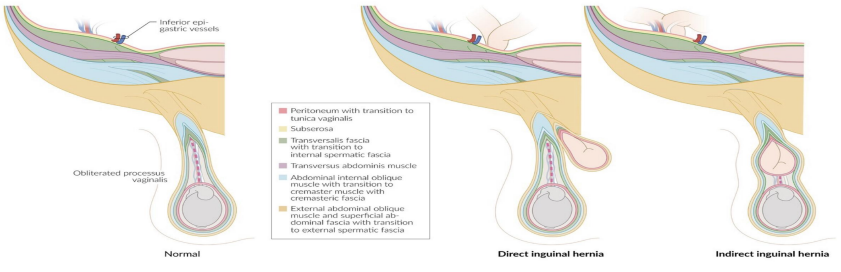
03

- The sac has **a wide neck,** so that the hernia **rarely** becomes irreducible, obstructs or strangulates.

2- Groin hernias (Inguinal)

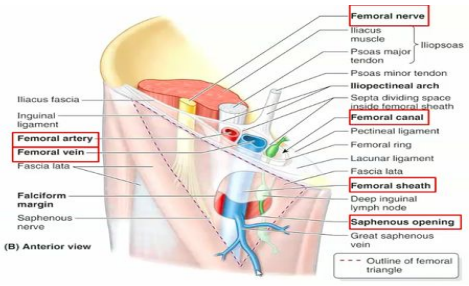
Clinical features of inguinal hernias: (Norman Browse)

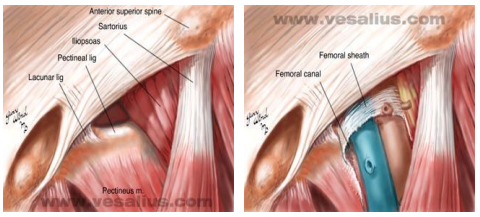
- Progressive pain and discomfort **at the groin**
- If very painful and tender hernia —> **strangulation**
- **can be painless swelling** in the groin or scrotum
- Colicky pain and bowel obstruction

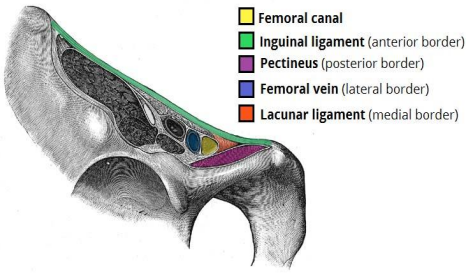
	Indirect hernia	Direct hernia
Prevalence	• Most common hernia in all genders. • Most commonly occur in **pediatrics**	• Most commonly occurs in males (**Adults**) • Rare in children
Predisposing factors	• Persistence of a **patent processus vaginalis (Birth defect)**	• weakness of the **abdominal wall** (hesselbach's triangle).
Site	• **Above** inguinal ligament, and **lateral** to the inferior epigastric artery. • Herniates through external and internal ring • Outside of the Hesselbach triangle • **The defect (Neck) is not palpable**, as it is behind the fibers of the external oblique muscle • Surrounded by the external spermatic fascia, cremasteric muscle fibers, and internal spermatic fascia	• **Above** inguinal ligament, and **medial** to the inferior epigastric artery and lateral to the rectus abdominis • The defect (neck) **may be felt** in the abdominal wall above the pubic tubercle • Only herniates through external ring • Within the Hesselbach triangle • Only surrounded by the external spermatic fascia
Clinical Features	• Lump is Clearly visible when patient stands, or asked to cough, and reduces when lying down • Resolve **spontaneously** in children within 1st year of life	• Lump is Clearly visible when patient stands, or asked to cough, and reduces when lying down • **Bilateral** hernia is usually direct
Signs	• Lump **can** present either at groin or **scrotum** • Reduces upwards, then **laterally (**to pass inguinal ligament) and backwards • **Controlled** after reduction by pressure at internal inguinal ring	• **Does not** (hardly ever) go down into the **scrotum** • Reduces upwards and then straight backwards • **Not Controlled** after reduction
Complications	• **Occasionally** irreducible, rarely strangulated • Testicular infarction is more common than bowel infarction.	• **Rarely** becomes irreducible, obstructs or strangulates.
Picture from AMBOSS		

2- Groin hernias (Femoral)

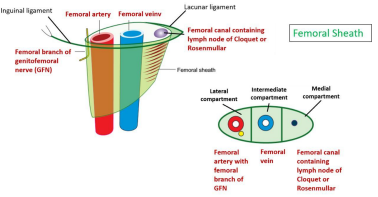
Surgical Anatomy of femoral hernia



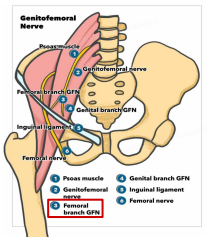




- What does the femoral **sheath contain** ?
  - surrounds the femoral vessels forming the femoral sheath.
  - Femoral vein Medially, and Femoral artery laterally and Femoral branch nerve (a branch of genitofemoral nerve) are inside the sheath
  - Femoral nerve is outside the lateral sheath

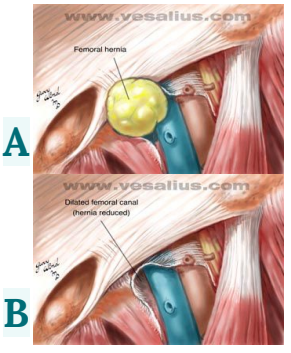


- What is in the femoral **canal** ?
  - The small space medial to the vein within the femoral sheath is the femoral canal through which **lymphatics** pass **from the thigh into the abdomen.**



Femoral Hernia

- Through the femoral canal
- Small, easy to miss on examination (delayed diagnosis)
- Picture (A): This is a bowel passing through the femoral canal forming femoral hernia.
- Picture (B): And this is when the hernia reduced “void of bowel”.
- As the hernia enlarges, it passes through the saphenous opening of the thigh and then turns upwards to lie in front of the inguinal ligament (Forms J-shaped course). This will lead to frequently difficult or impossible to reduce the hernia



Femoral Canal Boundaries

- Mnemonic from Dr.bishr: **CLIF**
- **Anterior:** Inguinal (Poupart’s) ligament
- **Posterior:** Pectineal (**C**ooper’s) Ligament
- **Lateral:** **F**emoral vein
- **Medial:** Edge of the **L**acunar (Gimbernat’s) ligament
  - In 10-20% of cases, the aberrant obturator artery passes adjacent to the lacunar ligament
- Want more details about these ligaments? Click here

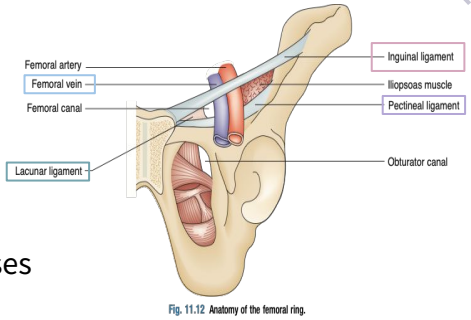


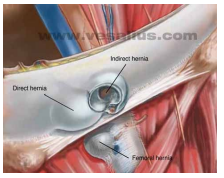
Fig. 11.12 Anatomy of the femoral ring.

Reference Picture

2- Groin hernias

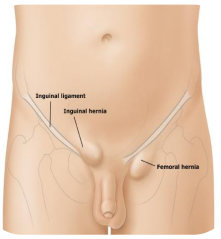
Surgical Anatomy of femoral hernia

- Look at the picture: What is the easiest way to locate pubic tubercle (the landmark of inguinal ligament) to locate inguinal ligament?
  By tracing the tendon of adductor longus upward



What's the simplest anatomical difference between inguinal and femoral hernias?

- **Inguinal hernias** in relation to:
  - Pubic tubercle: Above and medial
  - Inguinal ligament: Above
- **Femoral hernia**:
  - Pubic tubercle: Below and lateral
  - Inguinal ligament: Below



Clinical Features of femoral hernia

- **Predisposing factors** are similar to the direct hernia
- Femoral hernias are often small (Because it has many coverings) and easy to miss on clinical examination
- **They are prone to obstruction and strangulation** (Because it has a small (tight) neck) ~40% presents this way
- Patient presents either by a lump in the upper medial thigh may be the presenting symptom Or by exercise induced pain (groin pain related to exercise is also a common presentation
- Is frequently difficult or **impossible to reduce** because of its J-shaped course and the tight neck of the sac.
- There is cough impulse

Differentials:

- Inguinal lymph node (No cough impulse, irreducible)
- Saphenous varix: (positive cough impulse or 'saphenous thrill', which is prominent on standing but disappears on elevating the leg)
- Ectopic testis, psoas abscess, hydrocele of spermatic cord
  - Needle aspiration is not advisable for any such swelling (only after clearly defining diagnosis or after removal of the mass)
- Psoas abscess
- Hydrocele of spermatic cord

Sportsman hernia

- **Groin injury leading to** chronic groin pain is often referred to as the sportsman's hernia
- Mostly, there is no clinical signs (No lumps), despite the pain symptoms.
- If you perform dynamic U/S (rest and straining), you may find "impalpable hernia" in some patients which causes the pain, and you will find nothing in others.
- MRI is gold standard for diagnosis
- Treatment is controversial, some can be treated as hernia, and other will be treated with NSAIDs.
- A deficiency of the posterior inguinal wall is the most common operative finding in patients with chronic groin pain.
- The differential diagnosis includes: musculotendinous injuries, urological pathology, or bone and joint disease.

2- Groin hernias (Treatment)

Treatment of inguinal & Femoral hernias

Management is **not part of our objectives,** but some doctors mentioned it.

Normally: we make an opening in the sac and reduce the contents back to the abdomen, then remove the sac if **it's ALL PERITONEUM**

All hernias should be treated even if asymptomatic to prevent symptoms and complications especially if they are elderly

Surgical repair of the hernial defect is the only definitive treatment of inguinal hernia

The management of **direct** and **indirect inguinal** hernia does not differ

- **Complicated inguinal hernia**
  - ➔ **Strangulated hernia and / or sign of bowel obstruction:** emergency surgery (within hours) to minimize the likelihood of gangrene.
  - ➔ **Incarcerated hernia without strangulation:** manual reduction
    - Successful manual reduction: close monitoring + schedule an elective hernia repair as early as possible.
    - Unsuccessful manual reduction: urgent surgery.
- **Uncomplicated inguinal hernia**
  - **Reducible hernia:** elective surgery consider watchful waiting in select patients.

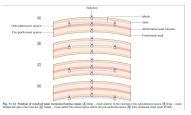
Treatment of **femoral** hernia: Surgery
- **Complicated femoral hernia:** Herniorrhaphy (Non-mesh)
- **Uncomplicated femoral hernia:** Hernioplasty (mesh repair)

Surgeries:
- **Hernioplasty (mesh repair) tension free repair** (زي الرقعة)
  - Definition: repair of a hernial defect using a synthetic mesh
  - Indication: gold standard for inguinal hernia repair

  Open surgery: Preferred in patients with complicated inguinal hernia or contraindications for laparoscopic repair (the main contraindication for laparoscopic surgery is high anesthesia risk),

  Laparoscopic surgery: preferred in patients with bilateral or recurrent inguinal hernia

  - When there is an opening in the abdominal wall. If you pull the two sides of the opening and suture them together, the tension on the sutures will be very high and chances of recurrence are high
  - When there is a hole in your tire, you don't stitch the hole up because that will leave the tire with a weak point. What you do is you cover the hole with something. In our case, It's a mesh
  - Position of mesh:
    - A is very bad since the chance of infection is high because it is relatively superficial
    - B is the worst since the foreign body (Mesh) will shrink and the chance of recurrence is very high
    - **C is the best**
    - D is okay but but the mesh causes adhesions with the bowel loops (it's done now with special double layered meshes that prevent adhesions)



- **Herniorrhaphy (non-mesh repair)**
  - Definition: open surgical repair of a hernial defect using autologous tissue
  - Indication: Consider in patients at high risk of surgical site infection.

Trusses
- They apply pressure to the hernia and reduce it backward, to keep the protruding tissue in place and relieve discomfort.
- Trusses can be used to provide symptomatic relief of hernias
- Hernia control (partial or total symptom relief) has been reported in 31-70% of patients with trusses.
  - Trusses should be used only for low-risk, completely reducible groin inguinal, **not femoral hernias**
  - Trusses should be preserved and offered to those in whom the surgical option is contraindicated, like those who cannot tolerate anaesthesia (severe CVD or respiratory disease)

Unilateral truss

Bilateral truss

2- Groin hernias (Treatment)

Surgical repair of uncomplicated hernia

- The first step in the open approach is to open the inguinal canal, free the hernial sac from the spermatic cord, reduce its contents, if any (like bowel or omentum), and excise it after **transfixing** and ligating its neck.
    - If the posterior wall is weak, then you need to add a mesh network to strengthen it (this is common in children and elderly)
    - In adults and adolescents, suture repair "without a mesh" is prefered, as the mesh my cause fibrosis and infertility

Reference Pictures

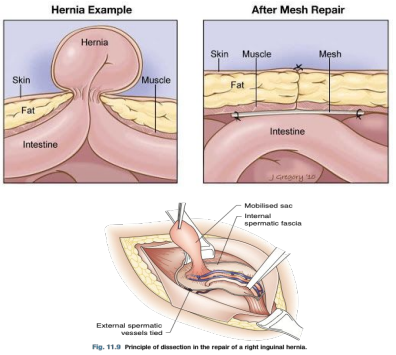


Fig. 11.9 Principle of dissection in the repair of a right inguinal hernia.

- Repair Types (No need to know the details of these procedures and how they are done. But at least have an idea about the different names)
    - Iliopubic Tract
    - Bassini
    - Shouldice
    - Cooper Ligament (McVay)
    - Lichtenstein (most common)
    - Plug and Patch
    - Preperitoneal: we come from outside of peritoneum we reduce the sac and the content and place the mesh over the defect without entering the peritoneal cavity.
    - Laparoscopic

Lichtenstein Repair

- (A) The lower border of the mesh is secured in place with a continuous suture to the inguinal ligament.
- (B) Interrupted sutures are placed between the upper edge of the mesh and the underlying aponeurosis.
- (C) A suture is placed laterally to close the two tails around the internal ring.
- Lichtenstein repair used **only for inguinal hernias**

- benefit of **laparoscopic surgery** is that the mesh is larger than that used at open surgery, and covers the direct, indirect and femoral hernial orifices. (**Prefered in bilateral or recurrent hernia)**

- McVay (Cooper ligament) repair: This is the only anterior tissue repair approach that treats all three groin hernias (Indirect, Direct, and femoral)

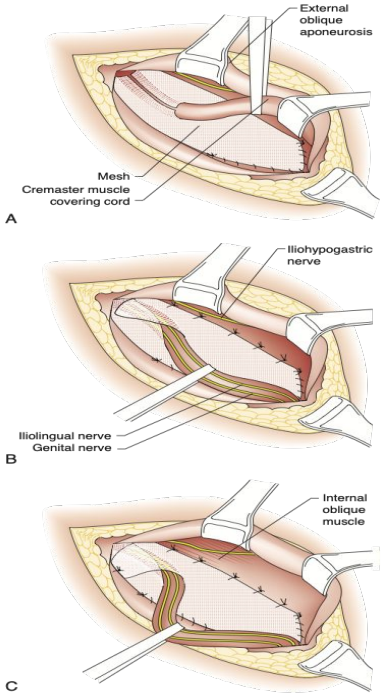


Fig. 11.10 Lichtenstein open mesh repair, right-sided hernia. (A) The lower border of the mesh is secured in place with a continuous suture to the inguinal ligament. (B) Interrupted sutures are placed between the upper edge of the mesh and the underlying aponeurosis. (C) A suture is placed laterally to close the two tails around the internal ring.

Reference Pictures

3- Other Hernias

- **Anterior Abdominal Wall**

1. Epigastric hernia (A)
2. Umbilical hernia (B)
3. Paraumbilical hernia (C)
4. Incisional hernia (E)
5. Divarication (diastasis)

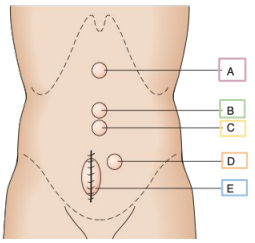
- **Lateral Abdominal Wall**

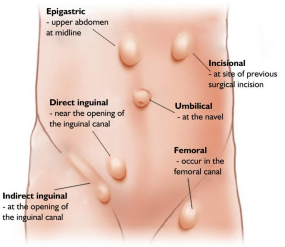
1. Lumbar hernias (Superior Lumbar & Inferior Lumbar)
2. Spigelian hernia (D)

- **Pelvic Hernias**

1. Obturator hernia
2. Perineal hernia

Reference Picture





Epigastric Hernia

Predisposing Factors

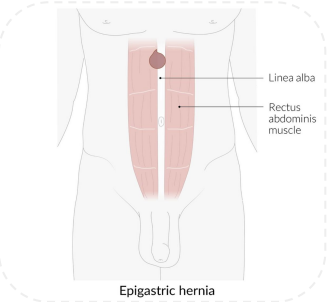
- Common in thin individuals
- Especially in children and associated with divarication of Rectus abdominis
- Common in individuals with a single aponeurotic decussation

Clinical Features

- It is a hernia of linea alba, above umbilicus and below xiphoid process
- Patient complain of a local discomfort at that site Especially during ingestion
- Rarely visible on inspection, but is palpable as a firm midline lump.

Complications

- The herniation may consist of extraperitoneal fat or may be a protrusion of peritoneum containing omentum.



Epigastric hernia

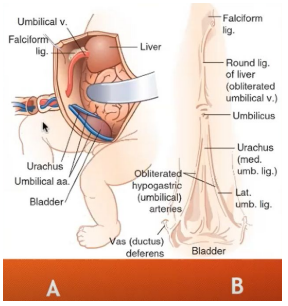
3- Other Hernias

Picture (A), in the fetus

- In the fetus, the umbilical vein radiates **superiorly** and
- the **two umbilical arteries** and **urachus** inferiorly radiate from the umbilicus

Picture (B), After birth

- **Umbilical vein** obliterated superiorly to become the round ligament of the liver.
- **Urachus** Obliterated to form **Median** umbilical ligaments inferiorly
- **Umbilical Arteries** obliterated to form **Lateral** umbilical ligament (called also the medial umbilical ligaments.)



Umbilical Hernia

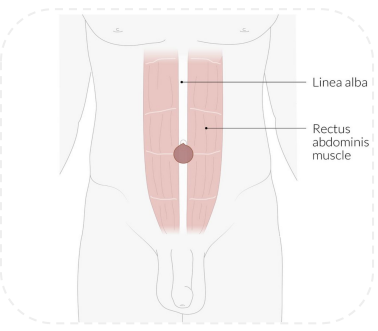
- Called also (**Infantile** umbilical hernia)

Predisposing Factors

- **Age group:** Occur in infants
- Protrude **through** Umbilical ring
- it is **caused** by a weakness in the adhesion between the scarred remnants of the umbilical cord and umbilical ring

Clinical Features

- These small hernias occur in the superior margin of the umbilical ring
- Easily reducible and become prominent when the infant cries
- Most of these hernias resolve within the first 24 months of life (Strangulation is rare
- Over 95% of these hernias close spontaneously in the first 3 years.. Persistence after the 3rd birthday is an indication for elective repair.



3- Other Hernias

Paraumbilical Hernia

- Called Also (**Acquired** umbilical Hernia)

Predisposing Factors

- **Age group:** occur in Adults (**Obese and Multiparous women**, Ascites)
- Protrusion is part of linea alba (Just above or below the Umbilicus): Above is more common
- Caused by gradual weakening of tissues around the umbilicus (This weakening can be caused by excessive stretching).

Clinical Features

- **Do not spontaneously resolve** but gradually increase in size
- The dense fibrous ring at the neck of this hernia makes strangulation of herniated intestine or omentum an important **complication**

- Both these hernias are **covered by skin**, while omphalocele is not.
- Omphalocele is a type of congenital hernia in which the contents of the abdomen are herniated through the umbilicus and covered only with peritoneum.

Incisional Hernias

Predisposing Factors

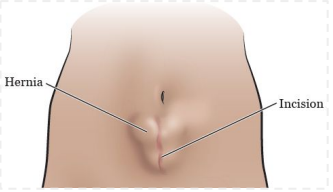
- Poor surgical technique.
- wound infection after surgery
- Obesity
- Especially Elderly, diabetic patients, Immunocompromised patients or patients on steroids (All have poor healing)

Clinical Features

- Hernia through an incision site
- >50% of incisional hernias occur in **the first 5 years** after the original surgery.
- **Midline vertical incisions** are most often affected.
- The Bulge is better seen when patient contract his abdomen muscles **"Coughing or raising from the bed"**

Complications

- Strangulation is rare, but surgical repair is usually advised.



3- Other Hernias

Divarication Hernias

Also called (rectus diastasis). Divarication of the rectus is a condition where the rectus abdominis muscles are no longer located next to each other as they run up and down the abdomen from the breastbone (xiphoid) to the pubic bone (symphysis pubis). The muscles separate from each other and is easiest to see when the patient does sit-ups and notices a linear bulge running up the centre of the abdomen.

-it is considered as rectus muscle disease, it is not true hernia

Predisposing Factors

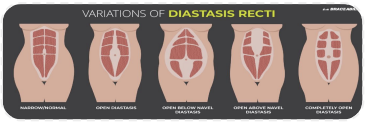
- It is an important risk factor for developing ventral hernia
- The most common cause in women is pregnancy.
- Heavier men can develop this condition in their upper abdomen as well.

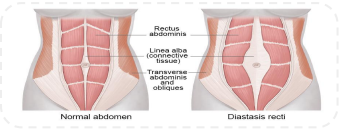
Clinical Features

- Pregnancy induced rectus divarication can cause a significant shape change to the abdominal wall, even for very slender patients. Males have their own unique pattern of rectus divarication noticed as a midline bulge located between the xiphoid and the umbilicus. When patients have significant pain or associated hernias, a repair can be performed.

Complications

- The condition itself has no risk, because the inner aspect of the abdominal wall is smooth. This means that bowel cannot find its way into a hernia and potentially strangulate. However, the divarication can be associated with umbilical or epigastric hernias.



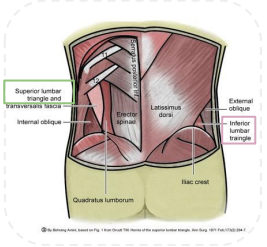


Lumbar Hernias

- **Grynfeltt's:** through superior lumbar triangle:
  - 12th rib, paraspinal muscles, and internal oblique.
  - More common
- **Petit's:** through inferior lumbar triangle :
  - iliac crest, latissimus dorsi muscle, and external oblique
- Both may occur primary due to increased intra-abdominal pressure, or secondary complication to spinal surgery

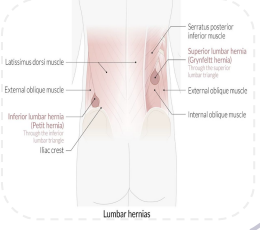
Predisposing Factors

- The overlapping nature of bulky muscles prevent the usual occurrence of hernias in these locations but acquired weakness after surgery, especially muscle cutting incisions or nerve damage leads to protrusion of lumbar fascia with extraperitoneal fat and an occasional hernial sac



Clinical Features

- patient may complain of back pain, cosmesis, or weakness of activities associated with use of these muscles, in addition to the presence of a visible lump



3- Other Hernias

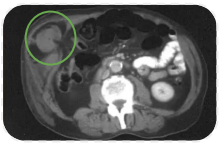
Spigelian Hernias

- Hernia through the Linea semilunaris the lateral border of the rectus sheath between rectus abdominis and lateral abdomin
- This area is Lack of posterior rectus fascia -> inherent weakness.
- Nearly all occur **at** or below the arcuate line
    - The conjunction of arcuate line and linea semilunaris is the weakest area.
- often interparietal - hernia sac dissects posterior to the external oblique aponeurosis. (at the outer border of the rectus abdominis muscle)
- Treatment is surgical, as the hernia is **liable to strangulate**
- absence of a posterior rectus sheath is a contributing factor at this location and therefore mostly occurs below the arcuate line

Predisposing Factors

- may be related to stretching in the abdominal wall caused by obesity, multiple pregnancies, previous surgery or scarring

This is the hernia

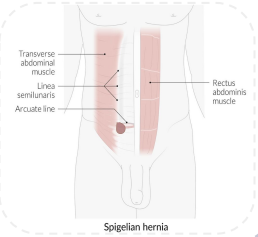


Clinical Features

- Symptoms can vary from abdominal pain, lump in the anterior abdominal wall or patient may have history of incarceration with or without intestinal obstruction. Pain varies in type, severity, and location and depends upon contents of hernia. Pain often can be provoked or aggravated by maneuvers that increase the intra abdominal pressure and is relieved by rest.

Complications

- The risk of incarceration and strangulation is high due to the small neck and lack of clinical features to suspect as such



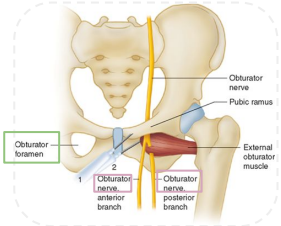
Spigelian hernia

Obturator Hernia

- Through the obturator canal
- The diagnosis is frequently made only when the hernia has strangulated and is discovered at laparotomy.

Predisposing Factors

- 9 times more common in females due to their wider pelvis
- Most patients over 50 years old
- The other risk factors include chronic obstructive pulmonary disease, chronic constipation and ascites

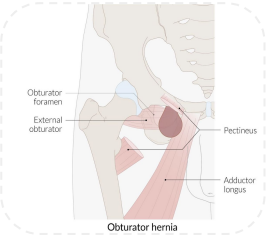


Clinical Features

- **knee pain** owing to pressure on the obturator nerve
- pain on the medial aspect of thigh due to compression of obturator nerve, or palpable mass on the medial aspect of thigh. however, the diagnosis is frequently made only when the hernia has strangulated and is discovered at laparotomy.

Complications

- rare pelvic hernia with incidence of 1% and most commonly presents as acute Intestinal Obstruction It can also contain Appendix, Meckel's Diverticulum or omentum



Obturator hernia

3- Other Hernias

Perineal Hernia

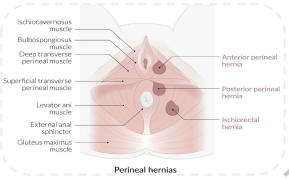
- Hernia sac protrudes through the pelvic diaphragm

Predisposing Factors

- Older, multiparous women , Multiple vaginal deliveries especially with difficult , prolonged labor
- iatrogenic in those who underwent rectal surgery
- surgeries associated include abdominoperineal resection , vaginal hysterectomy , and perineal prostatectomy .

Clinical Features

- The most common presenting signs of perineal hernia include tenesmus or constipation and perineal swelling. Perineal hernia is diagnosed by digital rectal examination



Sciatic Hernia

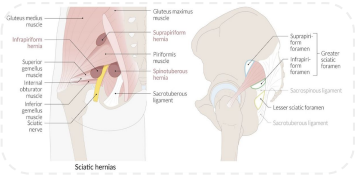
- Through greater or lesser sciatic foramen
- Small bowel, omentum, ureter, ovary,fallopian tube, colon, bladder or Meckel's diverticulum may form the contents of the herniated sac

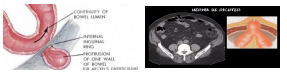
Predisposing Factors

- In adult female more commonly affected

Clinical Features

- Various presentations of sciatic hernia could be symptoms of bowel obstruction, ureteric obstruction, pelvic pain, lower back pain or sciatica . Sciatica occurs as a result of compression of the sciatic nerve by the herniated sac . Ureteric obstruction can occur if aureter is included in the herniated tissue.



★ Special Hernias "يحبون يسألون عنها بالاختبارات مع انها نادرة جدا" Know the rare hernias especially for the **OSCE**. **Richter and sliding** are more common than Littre and Amyand	
Littre's hernia	• hernia content include Meckel's diverticulum
Petersen hernia	• Seen after bariatric gastric bypass
Petit's, Gyrnfeltt's & Pantaloon hernias	• Peter's & Gyrnfeltt's had Mentioned Earlier in Lumbar hernia • Pantaloon: had mentioned in Inguinal hernias
Richter hernia 	• Incarcerated/strangulated hernia involving one sidewall of the bowel only (bowel wall only) 
Amyand's hernia	• Hernia sac containing a ruptured appendix
Sliding hernia	• It is a sort of **chronic** groin hernias in which the protruded organ is "fused" with the sac wall • is very important since retroperitoneal structures can form the wall • **Removing the sac is contraindicated in this case** 
Maydl's Hernia	• hernial sac contains two loops of bowel with another loop of bowel being intra-abdominal • Small, seen in males, predominantly in the right side. • Postural or manual reduction of the hernia is contraindicated as it may result in non-viable bowel being missed 

Hernia Complications

Irreducibility/Incarcerated

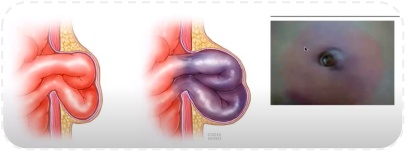
- Reducible hernia is when the intraperitoneal organs can move freely in and out of the hernia
- An irreducible hernia is one in which the contents cannot be manipulated back into the abdominal cavity.
- This may be due to narrowing of the neck of the sac by fibrosis, distension of the contained bowel, or adhesions to the walls of the sac.
- Irreducible hernia isn't an indication for emergent surgical intervention
- Can be detected by loss of cough impulse

Obstruction

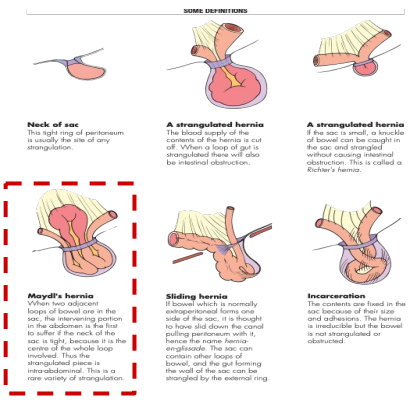
- Obstruction of the intestinal lumen (Precede the strangulation)
- There is no Ischemia
- Signs and symptoms of bowel obstruction (colicky abdominal pain, vomiting, constipation and distension) signal the **need for urgent operation** before strangulation supervenes.
- Obstruction is an indication of emergent surgery
- Painful, tenderness and no skin changes

Strangulation

- The worst possible complication. occur after obstruction
- The vessels supplying the bowel within a hernia may be compressed by the neck of the sac or by the constricting ring through which the hernia passes.
- The contents initially become swollen as a result of **venous congestion** (Veins occlude first) & Exudation
- The arterial supply is subsequently compromised and gangrene follows
- Very painful, skin changes which differentiate between it and obstructed hernia.
- The skin overlying the hernia is red, warm to touch and tender, **cough impulse is lost,** and there may be increasing evidence of circulatory collapse and sepsis.
- **In richter's hernia, there may be strangulation w/o obstruction signs** (Make it harder to diagnosis clinically, this non-diagnosed strangulation increases the mortality risk in these patients)
- In Maydl's hernia (Hernia-in-W shape) Postural or manual reduction of the hernia is **contraindicated** as it may result in non-viable bowel being missed (Look at the picture below)



- What is the main clinical feature to differentiate between Obstructed and strangulation hernia ?
  - The color of the lump (strangulated hernia will be darkened, reddish or bluish) Pain may present in both.
- Complete and incomplete hernia (occur in indirect hernia)
  - Complete extend to scrotum while incomplete remain in the inguinal canal
- If the lump **isn't** associated with cough impulse, you have to think of other differentialis depending of the site of that hernia (Lymph nodes, mass, etc)



4- Umbilicus Diseases (Norman Browse)

- The **commonest** abnormality of the umbilicus is an umbilical hernia, described earlier.
- The **important congenital abnormalities** of the umbilicus are exomphalos and fistula, and the common acquired conditions (apart from herniae) are inflammation and invasion by tumour.

Exomphalos (Omphalocele)

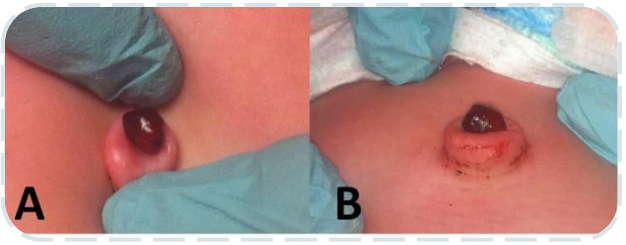
- The intestines protrude through a central defect of all layers of the abdominal wall.
- Void of skin (this is the difference from Umbilical hernia)
- Their only covering is a thin, transparent membrane formed from the remnant of the coverings of the yolk sac
- If this membrane ruptures, death from peritonitis may follow.

- Present at birth
- Represents an intrauterine **failure of the intestines to return to the abdomen**
  - combined with a failure of the two sides of the laterally developing abdominal wall to unite to cover the embryonic defect

Umbilical Granuloma

- It is a mass that occur in the umbilical ring, as result of inflammation, Granuloma and excessive granulation tissue
- The baby presents with an inflated umbilicus overlied by a bright-red, moist, friable, sometimes hemispherical mass of **bleeding** granulation tissue

- (You need to send a specimen for pathology to confirm it is a granulation tissue).



- Not present at birth. It occur gradually after the umbilical cord has been tied
- Usually regress spontaneously in the first month, if not the possibility of a patent vitello-intestinal duct or an umbilical adenoma should be considered.

4- Umbilicus Diseases (Norman Browse)

Umbilical Fistula

- Four structures pass through the umbilicus during fetal growth: the umbilical vein, the umbilical arteries, **the vitello-intestinal duct and the urachus**. If either of the last two tubes fails to close properly, there will be an intestinal or a urinary fistula.

Patent Vitello-intestinal tract

- The vitello-intestinal duct runs in intrauterine life from the apex of the midgut loop to the yolk sac. It is normally obliterated **long** before birth
- If not, it may persist as meckel's diverticulum, or rarely develop into another complication (Figure A)
  - (A) A Meckel's diverticulum.
  - (B) A fibrous cord to the ileum.
  - (C) An umbilical intestinal fistula.
  - (D) An enterocystoma.
  - (E) An umbilical sinus
  - (F) An enteroteratoma.
- Can Present either as **a complicated Intestinal fistula** in which food leak from the umbilicus**,** or resembles umbilical granuloma

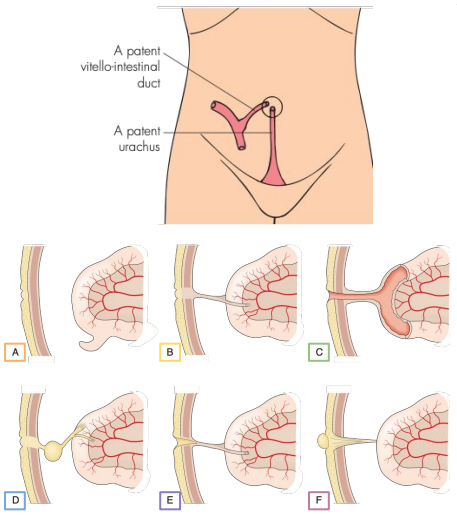
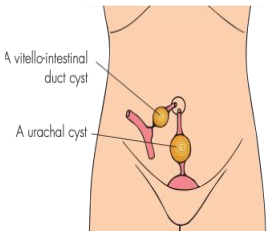


Figure A

Patent Urachus

- A patent urachus can become a track through which urine can leak through umbilicus



Predisposing Factors

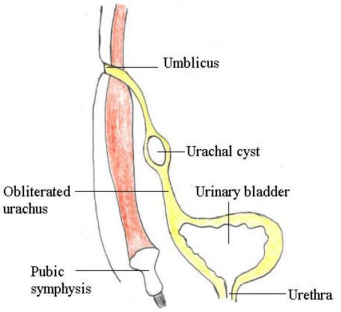
- Rare in children, more common in adults with chronic retention

Clinical Features

- The patient complains of a watery discharge from the umbilicus. (this discharge usually caused by umbilical infection, bladder fistula in which urine leak through the umbilicus is a complication)

Duct cyst

- Both these tracts may partially close, leaving a patent segment that becomes a cyst.
- **Vitello intestinal tract leaves a small mobile cyst**
- **Urachus tract cyst is immobile and large situated below the umbilicus**



4- Umbilicus Diseases (Norman Browse)

Umbilical Adenoma

- The mother complains that the baby has a lump (Raspberry like) at the umbilicus and a mucous discharge.
- Pathology specimen for confirmation
- An umbilical adenoma is a patch of intestinal epithelium left behind when the vitello-intestinal duct closes.

Omphalitis

- Infection of the umbilicus (Dermatitis)
- True omphalitis is infection of the stump of the umbilical cord **following inadequate postnatal care and cleanliness.**

Predisposing Factors

- **Common in adults**
- Risk factors include poor hygiene and sunken umbilicus caused by obesity
- The commonest cause of umbilical discharge. although, you need to exclude other causes.

Clinical Features

- The patient complains of umbilical discharge, pain and soreness.
- On examination, the skin within and around the umbilicus is red and tender (cellulitis) , and exuding a seropurulent discharge with a characteristic foul smell.

Causes of discharge from umbilicus

- Congenital
  - Intestinal fistula
  - Patent urachus
  - Umbilical adenoma
- Acquired
  - Umbilical granuloma
  - Dermatitis (intertrigo)
  - Ompholith (umbilical concretion)
  - Fistula (intestinal)
  - Secondary carcinoma
  - Endometriosis

Secondary deposits

01 Ompholith (Umbilical stones)

- A stone form from accumulation of sebum with broken hair (or clothes fluff) and remain as a lump.
- **Risk factor is poor hygiene** “especially in those with deep and narrow umbilicus i.e obese”
- Patient present with pain, or as umbilical infection.

02 Sister Joseph’s nodules

- These are A firm or hard nodule bulging into the umbilicus, underneath the skin or eroding through it, present in malignant cancer
- Primary malignant tumors are rare. Nearly all umbilical malignant tumors are metastatic through lymphatics from intra-abdominal cancer
- patient who is losing weight and looks unwell must attract your suspicion

4- Umbilicus Diseases (Norman Browse)

Endometrioma

- If in a female patient, the umbilicus enlarges, becomes painful and discharges blood during menstruation, it may contain a patch of ectopic endometrial tissue.

Discoloration of the umbilicus

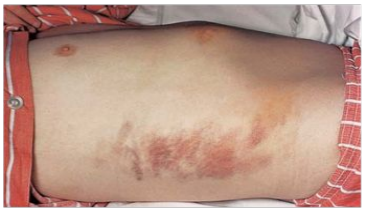
01 Blue Tinge

- around the umbilicus, caused by dilated, tortuous, sometimes visible veins, is called a caput medusae

02 Yellow-blue bruising

- Due to digested subcutaneous tissues following an attack of severe acute pancreatitis (E.g past history of gallstones)
- Occur after few days of the acute attack.
- Around the umbilicus **(Cullen's sign) =** tracked by falciform ligament to the umbilicus
- And in the flank **(Grey Turner's sign) =** tracked by retroperitoneal space

Cullen's sign



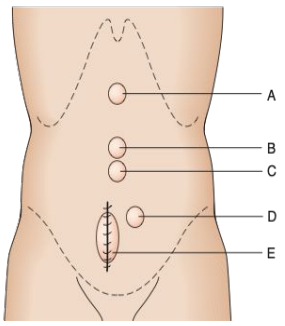
Grey turner's sign

03 Bruising

- can also be associated with intra-abdominal bleeding, particularly when it is extraperitoneal.
- Causes include ruptured ectopic pregnancy and accidental peri-uterine bleeding in pregnancy.

Important : examples of cases from the Dr

- you have 55 y.o male came with groin swelling that he had since the last year, on and off. What's your best diagnostic tool?
  - Most hernias are diagnosed clinically, You need to check reducibility and cough impulse to check the complications.
  - If the diagnosis was hard (As in sportsman's hernia, pain w/o a visible mass) you can use MRI or CT
- pt came with nausea, vomiting and abdominal distension, what's the Dx? "they may add picture"
  - Depending on the picture :) but generally abdominal distension is caused by intestinal **obstruction**, if the hernia was red or blue colored then it is **strangulation**
- they may show picture with A B C label of bowel ischemia and ask you how you are gonna treat it? which type of hernia caused this?
  - I suppose the picture will come like this



Summary

Recall

Q1:Why should hernias be repaired?
Answer: To avoid complications of incarceration/strangulation, bowel necrosis, SBO, pain

Q2: What is more dangerous: a small or large hernia defect?
Answer: Small defect is more dangerous because a tight defect is more likely to strangulate if incarcerated

Q3: What are the boundaries of Hesselbach's triangle?
Answer: 1. Inferior epigastric vessels 2. Inguinal ligament (Poupart's) 3. Lateral border of the rectus sheath Floor consists of internal oblique and the transversus abdominis muscle

Q4:What is the differential diagnosis for a mass in a healed C-section incision?
Answer: Hernia, ENDOMETRIOMA

Q5: Direct Inguinal Hernia
-**What is it?** Hernia within the floor of Hesselbach's triangle, that is, the hernia sac does not traverse the internal ring (Think: directly through the abdominal wall)
-What is the cause? Acquired defect from mechanical breakdown over the years
-What is the incidence? ≈1% of all men; frequency increases with advanced age
-What nerve runs with the spermatic cord in the inguinal canal? Ilioinguinal nerve
-What happens if you cut the ilioinguinal nerve? Numbness of inner thigh or lateral scrotum; usually goes away in 6 months

Q6: Indirect Inguinal hernia
What is it? Hernia through the internal ring of the inguinal canal, traveling down toward the external ring; it may enter the scrotum upon exiting the external ring (i.e., if complete); think of the hernia sac traveling indirectly through the abdominal wall from the internal ring to the external ring
What is the cause? Patent processus vaginalis (i.e., congenital)
What is the incidence? ≈5% of all men; most common hernia in both men and women
What is the risk of strangulation? Higher with indirect than direct inguinal hernia, but highest in femoral hernias

Q7:What is the hernia sac made of?
What is it? Hernia traveling beneath the inguinal ligament down the femoral canal medial to the femoral vessels (Think: FM radio, or Femoral hernia = Medial)
What are the boundaries of the femoral canal? 1. Cooper's ligament posteriorly 2. Inguinal ligament anteriorly. Femoral vein laterally 4. Lacunar ligament medially
What factors are associated with femoral hernias? Women, pregnancy, and exertion

Q8: Femoral hernia
Answer: Small defect is more dangerous because a tight defect is more likely to strangulate if incarcerated

Q9: What are the boundaries of Hesselbach's triangle?
Answer: 1. Inferior epigastric vessels 2. Inguinal ligament (Poupart's) 3. Lateral border of the rectus sheath Floor consists of internal oblique and the transversus abdominis muscle

Q10:Define the following terms:
Cullen's sign Bluish discoloration of the periumbilical area from retroperitoneal hemorrhage tracking around to the anterior abdominal wall through fascial planes
Grey Turner's sign Ecchymosis or discoloration of the flank in patients with retroperitoneal hemorrhage from dissecting blood from the retroperitoneum (Think: Grey TURNer = TURN side to side = flank [side] hematoma)

Q11:Omphalocele
What is it? Defect of abdominal wall at umbilical ring; sac covers extruded viscera
How is it diagnosed prenatally? May be seen on fetal U/S after 13 weeks' gestation, with elevated maternal AF
How is the diagnosis made? Prenatal U/S
What are the possible complications? Malrotation of the gut, anomalies
Of what "pentalogy" (Associated abnormalities) is omphalocele a part? Pentalogy of Cantrell
What is the pentalogy of Cantrell? "D COPS": Diaphragmatic defect (hernia) Cardiac abnormality Omphalocele Pericardium malformation/absence Sternal cleft

439's Quiz

Q1: A 67-year-old woman is brought to the emergency department by her husband because of a 1-hour history of severe groin pain, nausea, and vomiting. She has had a groin swelling that worsens with standing, coughing, and straining for the past 3 months. Her pulse is 120/min. Examination shows pallor; there is swelling, erythema, and tenderness to palpation of the right groin that is centered below the inguinal ligament. The most likely cause of this patient's condition is entrapment of an organ between which of the following structures?

A) Conjoint tendon and inguinal ligament
B) Transversalis fascia and internal oblique aponeurosis
C) Lacunar ligament and femoral vein

Q2: A previously healthy 20-year-old man comes to the physician because of a 6-month history of a painless mass in his left groin that has been gradually increasing in size. Physical examination shows a 3x3-cm oval, nontender left inguinal mass and a fluctuant, painless left scrotal swelling that increases in size with coughing. Which of the following is the most likely cause of this patient's symptoms?.

A) Weakening of transversalis fascia
B) Failure of processus vaginalis to close
C) Obstruction of left spermatic vein

Q3: A 14-month-old boy is brought to the physician by his mother because of an abdominal bulge that has become more noticeable as he began to walk 2 weeks ago. The bulge increases on crying and disappears when he is lying down. He was born at 39 weeks' gestation by lower segment transverse cesarean section. He has met all developmental milestones. He has been breastfed since birth. He appears healthy and active. Vital signs are within normal limits. Examination shows a nontender, 1-cm midabdominal mass that is easily reducible. The remainder of the examination shows no abnormalities. Which of the following is the most appropriate next step in management?.

A) Elective laparoscopic repair
B) Reassurance and observation
C) Abdominal ultrasonography

Q4: A 22-day-old male newborn is brought to the physician because of poor feeding, lethargy, and an abdominal protrusion. The child was delivered at home and has not yet been evaluated by a physician. The mother has not had routine prenatal care. The patient is at the 25th percentile for height, 50th percentile for weight, and 95th percentile for head circumference. Physical examination shows scleral icterus, pale facies, and an enlarged tongue. The abdomen is distended and there is a protruding mass at the abdominal midline. The skin covering the protrusion appears normal. When the newborn cries during the examination, the mass enlarges but is easily reducible. Which of the following is the most likely cause of the abdominal protrusion?.

A) Congenital weakness of the linea alba
B) Failed obliteration of the vitelline duct
C) Failed spontaneous closure of the umbilical ring

Answers

Q1	C
Q2	B
Q3	B
Q4	C

Extra Questions

439's Quiz

Explanations

Q1 Explanation: In the case of a femoral hernia, intra-abdominal contents (e.g., bowel, mesentery) pass into the femoral canal, which is bounded medially by the lacunar ligament and laterally by the femoral vein. Femoral hernias are more common in women and are likely to strangulate because the femoral canal is narrow.

Q2 Explanation: The processus vaginalis descends anterior to the testis via the gubernaculum during embryonic development. Failure of this conduit to obliterate after testicular descent into the scrotum causes outpouching of the parietal peritoneum (and bowel) through the deep inguinal ring, the inguinal canal, and the superficial inguinal ring, leading to an indirect inguinal hernia. These hernias are located outside the Hesselbach triangle, lateral to the inferior epigastric vessels, and can manifest with a communicating hydrocele, as seen in this patient.

Q3 Explanation: The vast majority of congenital umbilical hernias close spontaneously by age 5. Because the patient is asymptomatic and the hernia is small, the most appropriate management at this time is reassurance and observation. If the patient develops features of bowel obstruction, such as constipation, vomiting, or incessant crying, or if the hernia does not decrease with time, surgical repair may be indicated.

Q4 Explanation: Failure of the umbilical ring to close during fetal development causes congenital umbilical hernia. The midgut develops outside the abdominal cavity until the second trimester, when it physiologically herniates back into the abdomen. If the umbilical ring fails to close or the fascia in this region is underdeveloped, abdominal content may bulge through the umbilicus. Umbilical hernias are more common in children with chromosomal abnormalities (e.g., Down syndrome, Edwards syndrome) or congenital hypothyroidism, as seen here. Most congenital umbilical hernias resolve spontaneously by 5 years of age..

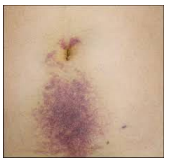
438's Quiz

Q1: which of the following is a common type of hernia that occurs in children
A) incisional hernia
B) direct hernia
C) femoral hernia
D) indirect hernia

Q2: which of the following is most liable to strangulation?
A) incisional hernia
B) direct hernia
C) femoral hernia
D) indirect hernia

Q3: what are the boundaries of Hesselbach's triangle?
A)inferior epigastric artery, lateral border of rectus abdominis, inguinal ligament
B) inferior epigastric artery, medial border of rectus abdominis, inguinal ligament
C) superior epigastric artery, lateral border of rectus abdominis, inguinal ligament
D) superior epigastric artery, medial border of rectus abdominis, inguinal ligament

Q4: what is the sign shown in the picture?
A) Cullen's
B) Grey Turner's
C) sister Joseph
D) castell



Q5:Patient came with apparent mass when he stands and it disappear with lying down, what is the diagnosis?
A)femoral hernia
B)inguinal hernia
C)communicable hydrocele
D)non communicable hydrocele

Q6:A 58-year-old man presents with a bulge in his right groin associated with mild discomfort. On examination the bulge is easily reducible and does not descend into the scrotum. Which of the following changes is most concerning for possible strangulation requiring emergent repair of the hernia?
A)increase in the size of the hernia
B)descent of the hernia to the scrotum
C)appearance of a new hernia in the left groin
D)worsening pain over the hernia during walking
E)inability to reduce the hernia

Answers

Q1	D	Q4	A
Q2	C	Q5	B
Q3	A	Q6	E

Extra Questions

Good Luck!

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439	438
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Feedback