

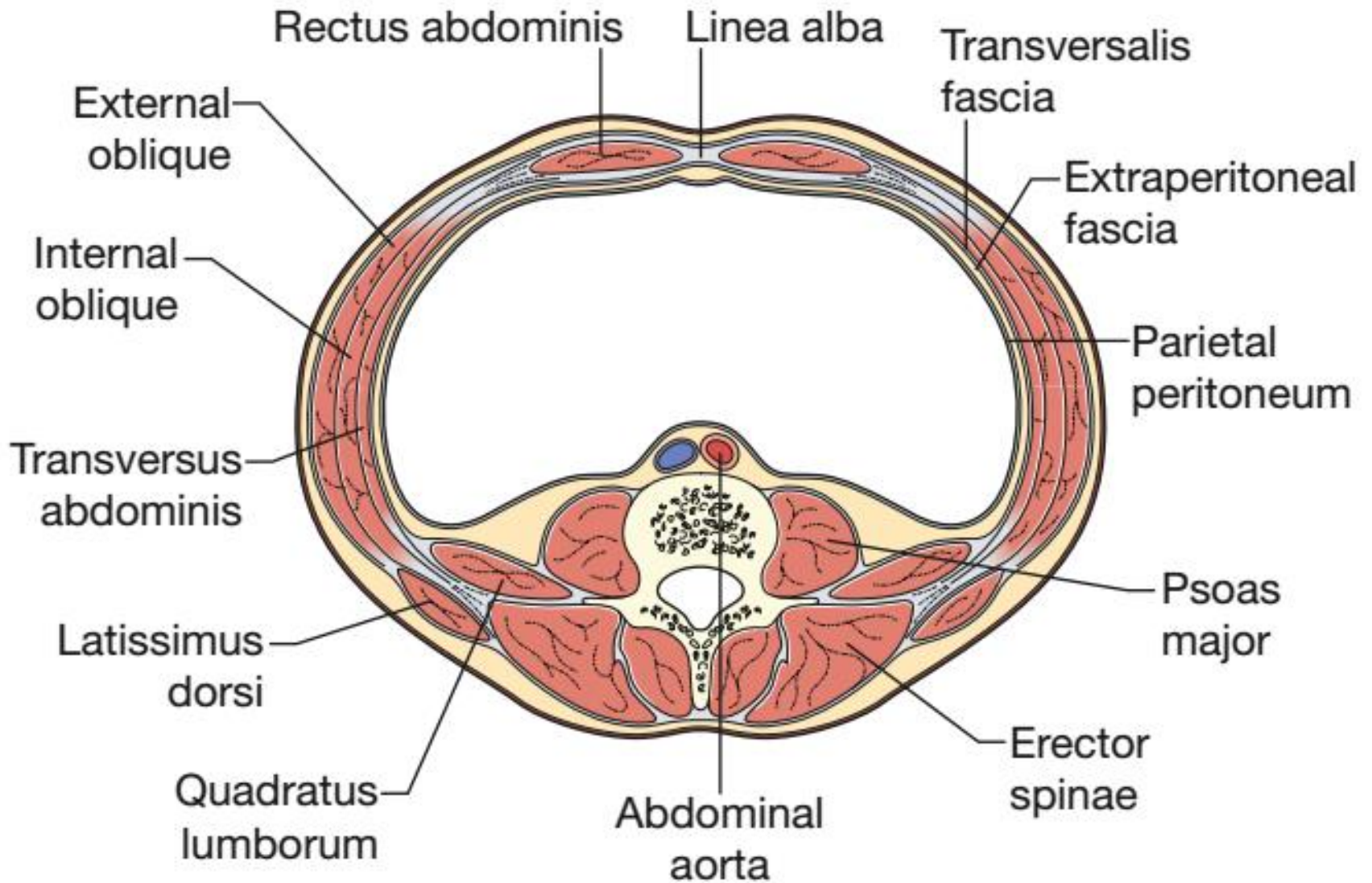
# ABDOMINAL WALL & HERNIA

---

# THE ABDOMINAL WALL

- The roof of the abdomen is formed by the diaphragm separating the thoracic cavity above, with negative pressure, from the abdomen below, with positive pressure.
- Weakness of the diaphragm can lead to much of the bowel being drawn into the chest down this pressure gradient.
- The bony pelvis forms the floor of the cavity but a muscular central portion, the perineum, may also weaken and allow rectum, bladder and gynecological organs to bulge downwards, a condition called prolapse.
- Posteriorly the muscles are strong, further supported by the vertebral column, ribs and pelvis.
- Two regions called the posterior triangles represent areas of weakness which can lead to rare lumbar hernias.
- Laterally there are three thin muscle layers the fibers of which criss-cross for strength and flexibility.

- Anteriorly the two powerful rectus abdominis muscles extend vertically from ribs to pelvis.
- Herniation through these strong muscles does not occur naturally but their central join, the linea alba, is an area of weakness resulting in epigastric and paraumbilical herniation.
- Divarification of the recti is the condition where the linea alba stretches laterally as the two rectus muscles separate.
- It occurs in the upper abdomen in middle-aged, overweight men but also as a result of birth trauma in women when it occurs below the umbilicus.



# ABDOMINAL HERNIA

- A hernia is the bulging of part of the contents of the abdominal cavity through a weakness in the abdominal wall.

## Anatomical causes of abdominal wall herniation

- Many structures pass into and out of the abdominal cavity creating weakness which can lead to hernia formation.
- The most common example is the
  1. **Inguinal hernia** in males, along which the testis descends from abdomen to scrotum at the time of birth. The testicular artery, veins and vas pass through this canal (the round ligament in females). In adult surgery, 80% of all hernia repairs are for inguinal hernia.
  2. Other examples are: esophagus → hiatus hernia, femoral vessels → femoral hernia, obturator nerve → obturator hernia, sciatic nerve → sciatic hernia.

- Failure of normal development may lead to weakness of the abdominal wall.
- Examples are diaphragmatic, umbilical and epigastric hernias.
- Muscles which should unite during development fail to form strong unions with hernia development at birth or in later life.
- Herniation at the umbilicus has both components, i.e. weakness due to structures passing through the abdominal wall in fetal life and developmental failure of closure.
- The risk of inguinal hernia is related to the anatomical shape of the pelvis and is higher in patients having a wider and shorter pelvis.
- Weakness of abdominal muscles may be the result of sharp trauma.
- Most commonly, this results from abdominal surgery but also occurs after stabbing.
- A surgical scar, even with perfect wound healing, has only 70% of the initial muscle strength.
- This loss of strength can result in herniation in at least 10% of surgical incisions.
- Smaller laparoscopic port-site incisions have a hernia rate of 1%. Increasing use of this surgical approach should lead to a fall in the incidence of incisional hernia.

## Causes of hernia

- Basic design weakness
- Weakness due to structures entering and leaving the abdomen
- Developmental failures
- Genetic weakness of collagen
- Sharp and blunt trauma
- Weakness due to ageing and pregnancy
- Primary neurological and muscle diseases
- ? Excessive intra-abdominal pressure

# Pathophysiology of hernia formation (Risk factors):

- A normal abdominal wall has sufficient strength to resist high abdominal pressure and prevent herniation of content.
- Herniation has been attributed to
  1. High abdominal pressures from constipation, prostatic symptoms, excessive coughing and obesity.
  2. A collagen disease' and due to an inherited imbalance in the types of collagen.
  3. Pregnancy due to hormonally induced laxity of pelvic ligaments.
  4. Elderly people due to degenerative weakness of muscles and fibrous tissue.
  5. Smoking.



## Types of hernia by complexity

- Occult – not detectable clinically; may cause severe pain
- Reducible – a swelling that appears and disappears
- Irreducible – a swelling that cannot be replaced in the abdomen, high risk of complications
- Strangulated – painful swelling with vascular compromise, requires urgent surgery
- Infarcted – when contents of the hernia have become gangrenous, high mortality

# Special types of hernia:

1. (Richter's hernia) only part of the bowel wall enters the hernia. It may be small and difficult or even impossible to detect clinically. Bowel obstruction may not be present but the bowel wall may still become necrotic and perforate with life-threatening consequences.
2. Femoral hernia may present in this way often with diagnostic delay and high risk to the patient (Figure 60.4).
3. Spigelian hernia : An interstitial hernia occurs when the hernia extends between the layers of muscle and not directly through them.
4. An internal hernia is a term used when adhesions form within the peritoneal cavity leading to abnormal pockets into which bowel can enter and become trapped.

# Clinical history and diagnosis in hernia cases

- Patients are usually aware of a lump on the abdominal wall under the skin.
- Self-diagnosis is common.
- The hernia is usually painless but patients may complain of an aching or heavy feeling.
- Sharp, intermittent pains suggest pinching of tissue.
- Severe pain should alert the surgeon to a high risk of strangulation.
- One should determine whether the hernia reduces spontaneously or needs to be helped.
- The patient should be asked about symptoms that might suggest bowel obstruction.
- It is important to know if this is a primary hernia or whether it is a recurrence after previous surgery.
- Recurrent hernia is more difficult to treat and may require a different surgical approach.

- General questions about the cardiac and respiratory systems are necessary to assess a patient's anesthetic risk.
- In a man with a groin hernia, history of prostatic symptoms indicates a high risk of postoperative urinary retention.
- Intake of anticoagulants such as warfarin is important because this impacts on future surgery.
- Checks:
  1. Reducibility
  2. Cough impulse
  3. Tenderness
  4. Overlying skin color changes
  5. Multiple defects/contralateral side
  6. Signs of previous repair
  7. Scrotal content for groin hernia
  8. Associated pathology

# Management principles

1. Not all hernias require surgical repair
2. Small hernias can be more dangerous than large
3. Pain, tenderness and skin color changes imply high risk of strangulation
4. Femoral hernia should always be repaired

# Surgical approaches to hernia

- All surgical repairs follow the same basic principles:
  1. Reduction of the hernia content into the abdominal cavity with removal of any non-viable tissue and bowel repair if necessary.
  2. Excision and closure of a peritoneal sac if present or replacing it deep to the muscles.
  3. Re-approximation of the walls of the neck of the hernia if possible.
  4. Permanent reinforcement of the abdominal wall defect with sutures or mesh.