



Abdominal Hernias

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17.1 Definition

A hernia is a circumscribed mass formed by an organ emerging (partially or completely) from the cavity where it is normally contained, through a parietal (congenital or acquired) orifice.

The abdominal cavity is a hollow cylinder containing the digestive organs. It is bordered at the back by the lumbar spine and the spinal muscles and laterally by three superimposed large muscles: the transverse abdominis muscle (oriented horizontally), the internal oblique muscle (oriented upward), and the external oblique muscle (oriented on both sides downward). These three muscles, in the front, join together at the midline to enclose in an aponeurosis the two rectus abdominis muscles vertically elongated on either side of the linea alba (as seen on Fig. 17.2). The abdominal cavity is separated from the thoracic cavity by the diaphragm and extends below into the pelvic cavity.

The walls surrounding the abdominal cavity have natural areas of weakness, such as the esophageal hiatus at the diaphragm, the deep inguinal opening at the groin on both sides, or the umbilicus at the anterior wall of the abdomen, which may lead to the formation of hernias. Hernias can be congenital or acquired.

17.2 Diaphragmatic Hernias

Hiatal hernia occurs at the level of the esophageal hiatus from the stretching of the phreno-esophageal membrane formed by the fusion of the endothoracic and endoabdominal fascias to attach the esophagus to the diaphragm pillars. An increase in the abdominal pressure (during physical effort, vomiting, or swallowing) can cause this membrane to stretch, allowing part of the stomach to move in the mediastinum.

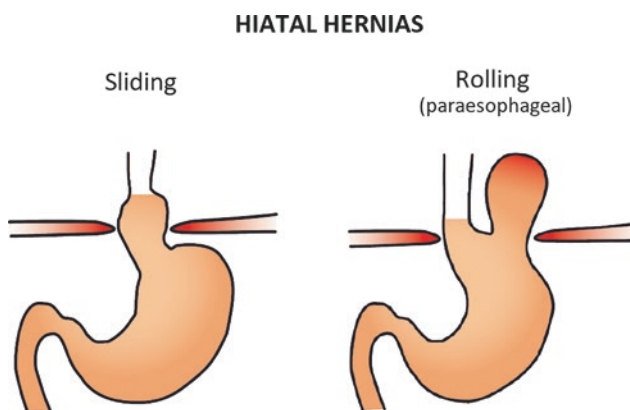


Fig. 17.1 Hiatal hernias

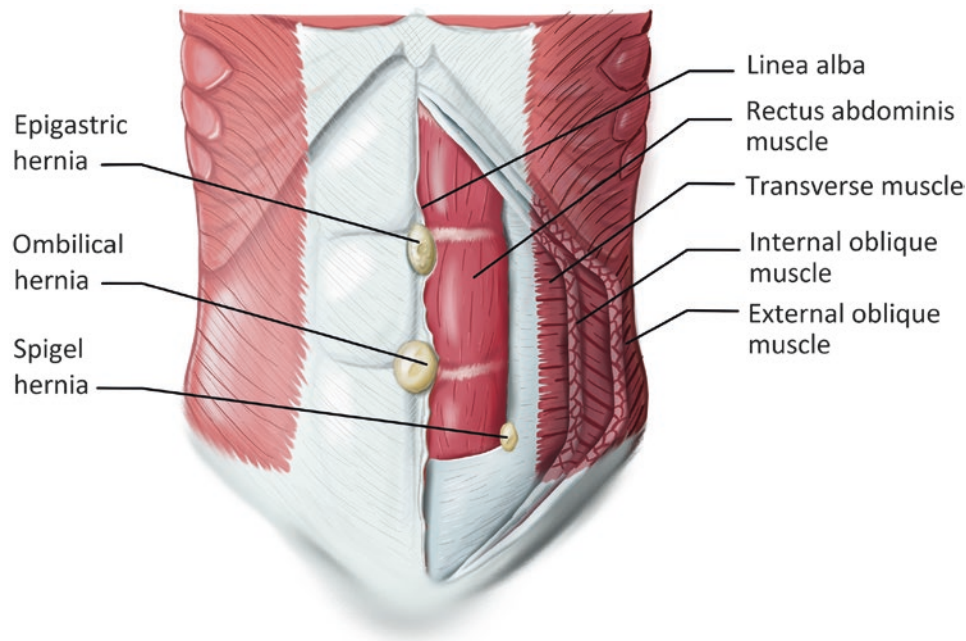
The most common type of hiatal hernia is the *sliding hernia*, where the cardia and a portion of the upper stomach slide upward into the thoracic cavity (see Fig. 17.1). In the *rolling (or paraesophageal) hernia*, the gastric fundus “rolls” along the esophagus into the mediastinum above the gastroesophageal junction (which most often remains positioned at the diaphragm). The sliding hernia may be associated with gastroesophageal reflux but only occasionally requires surgical correction. The paraesophageal hernia, responsible for chest pains and/or dysphagia, most often requires surgical treatment because of its risk of strangulation (and rupture with serious complications of mediastinitis). Hiatal hernias have been discussed in Chap. 1.

Other hernias of the diaphragm are much less common: the *Bochdalek hernia* at the side edge of the diaphragm due to an absence of a portion of the diaphragm (congenital or acquired following a trauma) and the *Morgagni hernia* occurring in the front of the diaphragm (at the junction between the internal mammary and the superior epigastric arteries) just below the xiphoid process.

17.3 Ventral Hernias

Ventral hernias are associated with a defect (most often of congenital origin) in the anterior abdominal wall (see Fig. 17.2).

- *Umbilical hernia* and *epigastric hernia* arise in the midline, in the region of the umbilicus and the epigastrium, respectively. They are often the result of a defective fusion of the rectus abdominis aponeurosis and result in the formation of a midline protrusion containing peritoneal fat or an intestinal loop. They may increase in volume under conditions that elevate the intra-abdominal pressure (such as pregnancy, ascites, and physical exercise). They are rarely symptomatic, but it is preferable to repair them, especially in young people (except for the umbilical hernia in newborns which may resolve spontaneously by the age of 2–3 years).
- *Spiegel's hernia* is an anatomical defect occurring at the point where the aponeurosis of the internal oblique muscle merges to the sheath of the rectus abdominis muscle. This transition (also known as the linea semilunaris) creates an area of weakness at the outer lateral border of the rectus abdominis, approximately 3 to 5 cm below the umbilicus. This condition is often difficult to diagnose clinically except for a typical subumbilical and paramedian pain. Surface ultrasonography or abdominal CT scan is used to establish the diagnosis before surgical treatment.



■ Fig. 17.2 Ventral (abdominal wall) hernia

- *Incisional hernias*, as the name suggests, occur at the site of an abdominal incision. It is the most common ventral hernia. It affects 10 to 15% of patients who have had an abdominal incision. The two most important etiological factors are smoking and post-operative wound infection. All types of incisions can present a hernia, but the most common are medial and supraumbilical incisions. The most important clinical manifestation is a bulge of the abdominal wall, more or less painful, increasing during effort. This type of hernia can be the site of an intestinal obstruction (from simple incarceration to strangulation and intestinal necrosis). It usually requires surgical repair, especially if it is of small caliber, as it is then at greater risk for incarceration.
- *Parastomal hernia* is a very specific incisional hernia developing in the presence of an ileostomy or colostomy. It occurs in 12–40% of patients with a permanent stoma, most often in the first few years after its creation. The consequences range from local pain to difficult fixing of ostomy bags or abdominal cramps but rarely to intestinal obstruction. Surgical repair is rarely indicated; it is reserved for acute complications or when there is a significant impairment of quality of life.

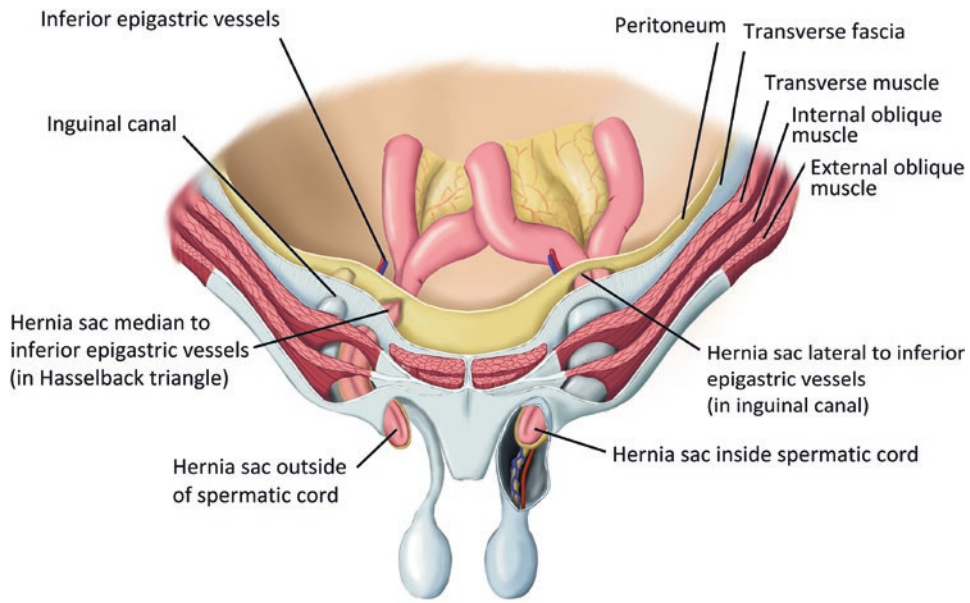
Clinical manifestations of ventral hernia Large hernias are associated with physical discomfort or cosmetic inconvenience but rarely with visceral incarceration since the intestinal loops are free to move without restriction on

both sides of the hernial orifice. Small hernias present a greater risk of intestinal incarceration since the herniated intestinal loop may remain trapped by the narrow hernial collar, outside the abdominal cavity, and then suffer strangulation with ischemia (due to the compromised vascularization caused by the incarceration). Manual reduction of the hernia before ischemia occurs avoids complications (necrosis or perforation of the herniated bowel loop, etc.) and allows for simple surgical correction of the abdominal wall defect later.

17.4 Groin Hernias

Groin hernia is the third most common reason for consultation in general surgery and the most common surgical procedure performed. Its prevalence is estimated between 10 and 25% in men (8 times more often than in women), and its incidence increases with age.

- *Indirect inguinal hernia* is the most frequent (in both men and women) and corresponds to approximately 55% of groin hernias. It results from the outward passage of abdominal contents along the inguinal cord in men (spermatic vessels and vas deferens) or along the round ligament in women (see ■ Figs. 17.3 and 17.4). An indirect inguinal hernia is due to the failure of the vaginal process to close during the descent of the testis (or round ligament) which normally occurs between the 12th week of gestation and birth. This descent is made thanks to the gubernacu-



DIRECT HERNIA

INDIRECT HERNIA

Fig. 17.3 Inguinal hernias : anterior view

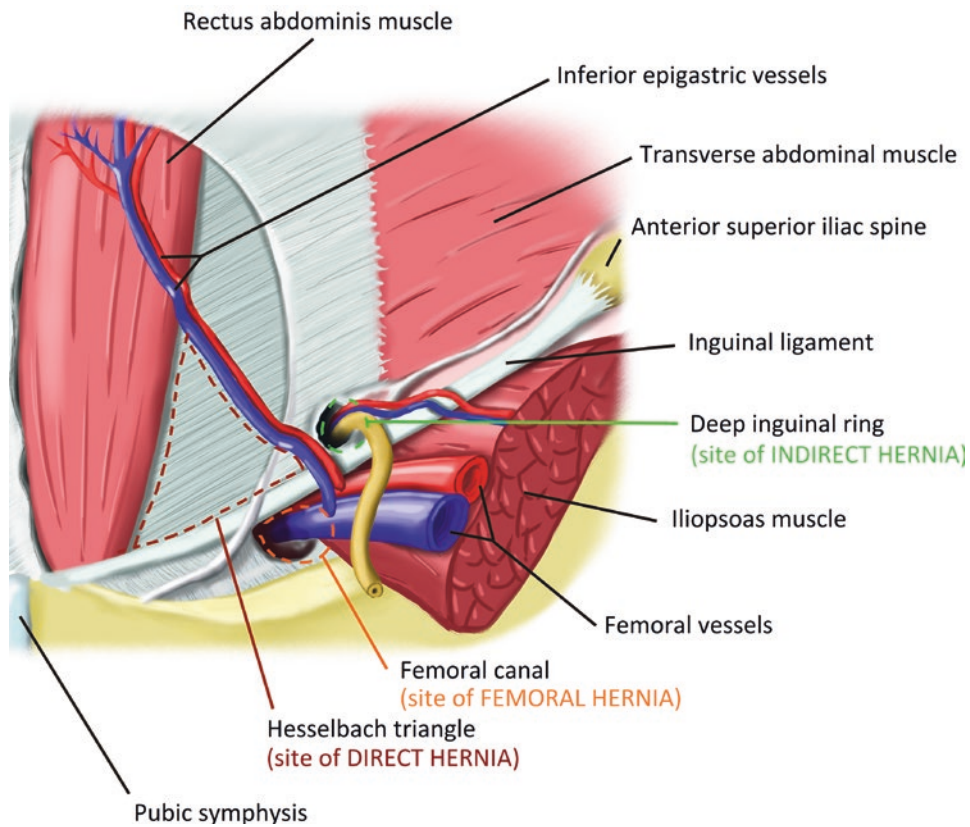


Fig. 17.4 Groin hernias: posterior view

lum testis which carries the testis and some peritoneum (vaginal process) toward the scrotum by passing through the three muscles constituting the abdominal wall, i.e., the transverse abdominal muscle and the internal oblique muscle, which delimit the internal (deep) orifice of the inguinal canal, and the external oblique muscle which forms the external (superficial) orifice of the canal.

- *Direct inguinal hernia* (see ■ Figs. 17.3 and 17.4) accounts for 40% of hernias in men and 20% in women. It is most often due to a weakness or tearing of the floor of the inguinal canal, which on the internal side of the lower (or deep) epigastric vessels (originating from the external iliac artery) is supported only by the transversalis fascia and the aponeurosis of the transverse muscle. This area of weakness is therefore susceptible to deterioration with age or to tearing during an increase in intra-abdominal pressure. This area is defined as Hesselbach's triangle, which is bounded inferiorly by the inguinal ligament, laterally by the inferior epigastric vessels, and medially by the lateral border of the rectus abdominis muscle.
- *Femoral hernia* (■ Fig. 17.4) accounts for 10% of groin hernias and is seen more frequently in women than in men (25% vs. 5%). It occurs at an older age and is complicated by incarceration in nearly 40% of cases. It is located under the inguinal ligament, medial to the femoral sheath and lateral to the lacunar ligament (of Gimbernat). The differential diagnosis of a mass in this region includes a lymphadenopathy (Cloquet's gland associated with anal or pelvic infection or metastasis).

Clinical manifestations of inguinal hernia Groin hernia results in an inguinal bulge, often accompanied by discomfort or a feeling of local heaviness. Acute or severe pain is rarely present; it should then raise the suspicion of an incarceration (manually irreducible inguinal hernia) or a strangulation (incarcerated hernia with clinical signs of intestinal ischemia, such as heat and local redness, and associated or not with intestinal obstruction).

The clinical examination allows in most cases to establish the diagnosis of groin hernia. An inguinal hernia can be seen in the standing position, easily reducible with local pressure, and completely reducible in the lying position. The hernia is most often on the right side and, in 15% of cases, can occur on both sides of the abdomen. In the case of a small hernia, the index

finger can be inserted into the inguinal canal (thanks to the mobility of the scrotal skin) to feel a bulge in the inguinal canal during Valsalva maneuvers or coughing. The differentiation between a direct and an indirect inguinal hernia is often clinically difficult. During the surgical exploration, the position of the hernia outside (indirect hernia) or inside (direct hernia) the lower epigastric vessels serves as a diagnostic landmark.

The treatment of groin hernia is surgical and varies according to the patient's medical condition, age, and expectations.

17.5 Pelvic Hernias

- *Obturator hernia*, although rare, is the most common pelvic hernia. It most often (>90% of cases) presents as an intestinal obstruction and is diagnosed at laparotomy. It is most often encountered in women who had significant weight loss. This hernia occurs at the level of the obturator foramen (allowing the passage of the obturator nerve and covered by the internal obturator muscle and the obturator membrane). Clinically, patients complain of inguinal pain radiating along the inner thigh.
- *Ischiatic (sciatic) hernias* are rare. They occur either in the superior ischial notch, where the sciatic nerve passes over the piriformis muscle, or in the inferior ischial notch, where the pudendal artery and nerve pass.
- *Perineal hernia* occurs following a surgical procedure on the perineum and is similar to the incisional hernia of the abdominal wall.

17.6 Flank Hernias

These hernias occur on the sides or back of the abdominal wall, in the lumbar region. Two triangles are defined that can be the object of hernias. The upper lumbar triangle (Grynfeltt) is an inverted triangle bounded superiorly by the 12th rib and laterally by the erector spinae muscles of the lumbar spine and the internal abdominal oblique muscle. The lower lumbar triangle (Jean-Louis Petit) is a triangle based on the iliac crest and bounded on both sides by the latissimus dorsi and external abdominal oblique muscles, respectively. These hernias most often occur following urological surgery.