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Introductory Chapter: Different Types of Parietal Hernias, Diagnosis and Treatment

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1. Introduction

Hernias of the abdominal wall are one of the most frequently encountered pathologies by the general surgeon in his daily practice, constituting a serious socioeconomic problem despite their frequency, the high rates of recurrence and complications.

Strangulation is the most frequent and serious complication of hernia.

Hernias are the most common cause of acute intestinal obstruction. The early repair of these hernias has markedly reduced the frequency of incarceration of intestine in these musculo-fascial defects.

The common sites for these defects, in order of frequency, are inguinal, umbilical, incisional and femoral. Some other hernias are very rare such as lumbar, epigastric, spigelian, sciatic and obturator hernia.

Techniques of repair continue to progress from simple herniorraphy to hernioplasty.

But tension-free mesh repairs are the current standard. Actually, laparoscopic approach and robotic surgery contribute to develop the management of this pathology.

2. Inguinal hernia

2.1. Different types of inguinal hernias

Inguinal hernias are the most common type of hernia. They represent approximately two thirds of adult hernias and are much more common in men than in women. Inguinal is the most common form of hernia. It is most frequent in man. This hernia could be either indirect or direct. The weakness that occurs in the abdominal wall may be present at birth in case of congenital hernia or may develop later on in life.

An indirect inguinal hernia is in most cases a congenital lesion. It occurs as a result of the deep inguinal ring failing to close during embryogenesis with persistence of peritoneo-vaginal canal. Diagnosis of this type of hernia could be done early after birth or later.

Direct hernias are frequent in adults and old patients. These hernias are acquired and occur due to a weakness of the floor or posterior wall in Hesselbach triangle. Only the transversalis fascia constitutes the posterior wall of this inguinal canal at the inferior border of the transverse muscular arch and of the internal oblique and tries to oppose the appearance of a direct hernia. Direct hernias do not have a true peritoneal sac and do not expose to incarceration risk of the bowel. Their treatment consists usually of a reinforcement of the posterior wall by a prosthetic grid.

2.2. History of inguinal hernia repairs

With neither essential anatomical knowledge nor effective anaesthesia and under threat of septic peril, the empirical operators of the past had to confine themselves to either trying to disappear the hernial 'tumour' or prevent the descent of the viscera [1].

Until the beginning of the eighteenth century, surgery for scrotal hernias was dominated by castration, with iron or cautery.

The bandages are the oldest means to contain the visceral descent. It began with the Greeks and Egyptians.

Modern surgery began with the Italian Edouardo Bassini [2] who sutured the elements of the posterior wall of the inguinal canal and published the results of 400 operations. The results of these operations were very encouraging. The recurrence rate was very low.

The Canadian surgeons from Toronto described the E. Shouldice technique (1945–1951) dedicated to the treatment of hernias and allowed the development of a process that consists of a triple suture of the posterior wall of the inguinal canal. This intervention that stems directly from that of Bassini will be a considerable success. The shouldice repair became the gold standard for the prosthesis-free treatment of inguinal hernias.

More recently, the prosthetic procedures have been introduced as the treatment of inguinal hernia. The repair of irretrievably deteriorated walls is made possible by the replacement of the transversalis fascia with synthetic tulle. The nylon has been applied in France by Don Aquaviva of Marseille since 1944.

In 1965, Rives and Stoppa, French surgeons from Amiens, described for the first time the pre-peritoneal approach using a mesh to repair inguinal hernia.

The concept of 'tension-free' repair for hernias In Lichtenstein [3] was described as early as 1959 by J. Zagdoun at the surgical academy and forms the basis of the Lichtenstein technique.

With the development of laparoscopic surgery of hernias, new prostheses have been created to be implanted in the peritoneal space.

Finally, one of the most spectacular innovations is undoubtedly the emergence of Laparoscopic pathway. Two laparoscopic techniques have been performed to treat inguinal hernia using a mesh: the extraperitoneal approach (TEP) and transperitoneal approach (TAPP). Nowadays, robotic surgery has been introduced in some centres to treat inguinal hernias [4].

However, the high cost of this technique is a limiting factor to be widespread.

3. Femoral hernia

These hernias are much less common than inguinal hernias and account for only 3% of all hernias

Unlike inguinal hernias, femoral hernias occur more commonly in females.

The femoral orifice is limited by the following elements: on the top and front the crural arch, the lower and posterior pubis with Cooper's ligament, the Gimbernat ligament inside (fills the angle internal between pubis and crural arch), outside the fibrous septum bordering the femoral vein with the artery outside it. This orifice is narrow and inextensible

Most femoral hernias are asymptomatic. However, they can occasionally lead to severe problems such as strangulation. These hernias expose to a high risk of strangulation. The diagnosis could be difficult in some cases mainly in obese patients. Imaging techniques such as ultrasonography, CT scan or MRI could be helpful.

The treatment of this type of hernia was at first a herniorrhaphy using the Mac-Vay technique. Currently, the tension-free repair using a mesh by open or by laparoscopic approach is the most used technique.

4. Umbilical hernia

This type of hernia may develop in babies if the opening through which the umbilical cord passes does not close properly after birth. This hernia can also affect adults mainly due to obesity, pregnancy or cirrhosis.

Umbilical hernias are congenital in origin and often occur during infancy; spontaneous closure by the age of 2 years is common. Even large hernias (5–6 cm in all dimensions) have been known to disappear spontaneously by 5–6 years of age.

Thus, surgery is not required for small or moderate hernias before the age of 6 years.

In adults, umbilical hernias may develop more commonly in women, usually in post partum and predispose to strangulation. Cirrhotic patients are exposed to develop more frequently complications such as rupture, and their treatment remains difficult.

The surgical treatment in adults is mainly based on prosthesis repair. Different techniques are described and consist of either open or laproscopic approach.

5. Incisional hernia

Incisional hernias occur in 5–10% of patients after previous laparotomy. Obesity, wound infection and iterative laprotomy are the most frequent causes of incisional hernias.

Incisional hernias are usually diffuse bulges, but the strangulation risk is more important in the small defect with rigid margins.

Incisional hernias are usually treated by general surgeons.

The repair of the musculoaponeurotic wall defect requires usually the use of mesh [5].

Plastic surgeons, usually concerned with the correction of the abdominal fat and skin excesses by liposuction or abdominal dermolipectomy, should be associated to the general surgeons to treat incisional hernia in order to perform the abdominoplasty.

The concept of association between the repair of an incisional hernia and the dermolipectomy is not new.

In the 1990s, Ramirez and Al [6] and Di Bello and Moore [7] already associated dermolipectomy and certain techniques of parietoplasty (in mobilisation by sections and sutures, the various musculo-aponeurotic components). They find respectively a rate of recurrence of 8 and 8.5% [8].

The most frequent situation consists of an aponeurotic distension or a diastasis of the rectus abdominal muscles generally corrected by aponeurotic suture.

Aesthetic disgraces are those that modify the outline of the body, due mainly to the flaccidity of the abdominal wall, accumulation of fat, and weakening of both the aponeurosis and muscle system [9].

Type I	Abdominal lipodystrophy without skin flaccidity; absence of diastasis or hernia
Type II	Moderate abdominal lipodystrophy with diastasis
Type III	Accentuated abdominal lipodystrophy with cutaneous flaccidity and excess; presence of diastasis; with or without associated scar
Type IV	Skin flaccidity and/or lipodystrophy, with diastasis or eventration; associated scar

Table 1. Pitanguy's classification of aesthetic abdominal deformities [10].

Ivo Petanguy who is a plastic surgeon from Brazil, proposed a classification of abdominal deformities in four types (See **Table 1**). The author proposed a special management of the abdominal deformity and the musculo-aponeurotic defect or flaccidity according to his classification [10].

6. Other hernia sites

6.1. Epigastric

Epigastric hernias occur in the linea alba. They are rare and account for less than 2% of hernias. These hernias are usually due to an important activity related to increased physical activity of the abdomen, as it is usually the case during weightlifting or weightlifting exercises. Epigastric hernia may also occur in the case of people with chronic and significant cough. This hernia usually does not require surgery unless it becomes too troublesome or painful phenomena appear.

6.2. Spigelian

Spigelian hernia occurs through slit-like defect in the anterior abdominal wall adjacent to the semilunar line. This hernia was first described by Klinkosch in 1764. Most of spigelian hernias occur in the lower abdomen, where the posterior sheath is deficient. Spigelian hernia can be congenital or acquired.

Spigelian hernia is very rare, and moreover, it is difficult to diagnose clinically. Usually, imaging is necessary to establish the diagnosis. CT scan is considered the most reliable technique to make the diagnosis in difficult or doubtful cases. Surgery can be performed either by open technique or by laparoscopy [11].

6.3. Obturator

Obturator hernia is a rare variety of abdominal hernia. It occurs mainly in elderly females. The obturator hernia develops at the obturator orifice in the pelvis. This is an uncommon hernia. Their diagnosis is quite often difficult. Deep pain in the pelvis and in the inner surface of the thigh is the most frequent symptom of that hernia. In case of suspicion, a CT scan will allow the diagnosis. Due to their diagnostic difficulty, these hernias are often diagnosed during surgery or due to complication such as intestinal obstruction [12].

Despite its rarity, a variety of operative approaches have been described to repair the obturator hernia. These include the abdominal approach and more recently, the laparoscopic approach.

6.4. Sciatic

The greater sciatic foramen can also be the site of a relatively uncommon hernia. Sciatic hernias often present as pelvic pain, particularly in women, and diagnosis can be difficult. Patients often present with pain on standing, and diagnosis is often made when a complication occurs such as bowel obstruction. However, a sciatic hernia rarely causes sciatic nerve pain.

Surgery should be performed once the diagnosis is made. Transabdominal and transgluteal operative approaches are performed including laparoscopic repair [13].

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