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ORIGINAL ARTICLE

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Inguinal hernia: the size of the mesh

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Abstract The size of the mesh used for surgical repair of groin hernias differs significantly from one technique to another. Such differences are not unimportant, since implantation of a large amount of prosthetic material can induce some drawbacks and may perhaps be avoided in many cases. The weak inguinal area, where inguinal hernias are exteriorized, is smaller than the myopectineal orifice, and a mesh 8-9 cm long and
5-6 cm wide is sufficient to cover this area. The results of methods using a small mesh are good, and large patches provide at best the same results with some real drawbacks. A large mesh spread in the preperitoneal space on the bladder and iliac vessels can induce some difficulties in case of further operation on these organs, and when we operate on a man 30 to 50 years old, we ignore whether he may need that kind of operation many years later. Consequently, in most cases a small patch covering only the weak inguinal area is preferable and a large preperitoneal patch should be used only in selected cases at high risk of recurrence.

Keywords Hernia · Inguinal · Femoral· Anatomy · Surgery · Complications · Prosthetic mesh

Introduction

The size of the mesh used for surgical repair of groin hernias differs significantly from one technique to another. For instance, the area of the patch generally used in laparoscopic hernia repair averages 200 cm2, while it is around 80 cm2 for the Lichtenstein technique and 40 cm2 to 50 cm2 in procedures using a small onlay mesh, like the plug and patch or Trabucco's method.

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Such differences are important. Nyhus recently outlined the drawbacks of too extensive usage of mesh repairs and pleaded for their limitation, mainly in hernias of types I, II, and IIIc of his classification [14]. In type IIIa and IIIb hernias, the use of a mesh is justified by the weakness of the posterior wall of the inguinal canal. But implantation of a big amount of prosthetic material can induce some drawbacks and may perhaps be avoided in many cases.

We examine here the anatomical and clinical bases of an objective choice concerning the size of the mesh.

Anatomical data

The myopectineal orifice described by Fruchaud [5] is bordered inferiorly by the pectineal branch of the pubic bone, superiorly by the inferior border of the internal oblique muscle, laterally by the iliopsoas muscle, and medially by the rectus muscle (Fig. 1). It is usual nowadays to refer to Fruchaud and say that the mesh must cover the whole myopectineal orifice. But the part of this orifice located below the iliopubic tract is filled laterally by the iliofemoral vessels and medially by the ligament of Gimbernat. The femoral orifice close to the vein is small in size (Fig. 1). Femoral and prevascular hernias are uncommon. The great majority of groin hernias are inguinal, and they protrude through the area located above the iliopubic tract named by Fruchaud "the weak inguinal area" [5]. This area is on the whole oval-shaped and quite a bit smaller than the myopectineal orifice. It is limited inferiorly by the iliopubic tract and superiorly by the inferior border of the transverse muscle. Its lateral extremity is determined by the junction of these two
structures and its medial extremity by the ligament of Henle (Fig. 1). This area corresponds to the lateral and medial triangles described by Gilbert [7].

Trabucco measured the dimensions of what he names "the inguinal box" in 800 inguinal hernioplasties [22]. The average length from the anterior superior iliac spine to the pubic tubercle is 12 cm. The average distances

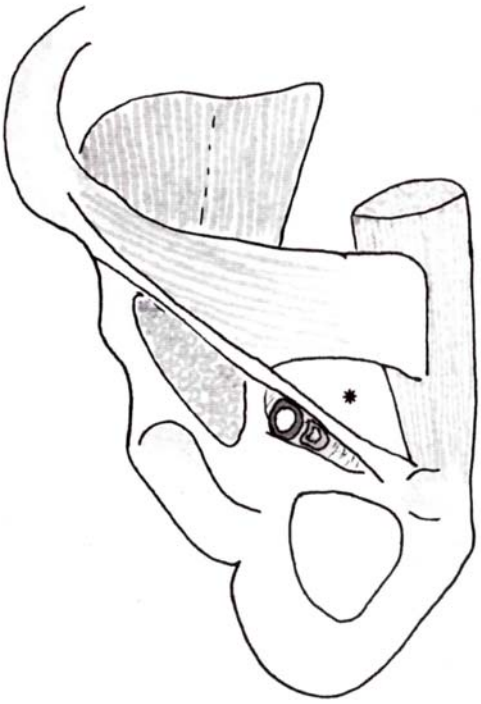

Fig. 1. The myopectineal orifice and the "weak inguinal area" (*), according to Fruchaud

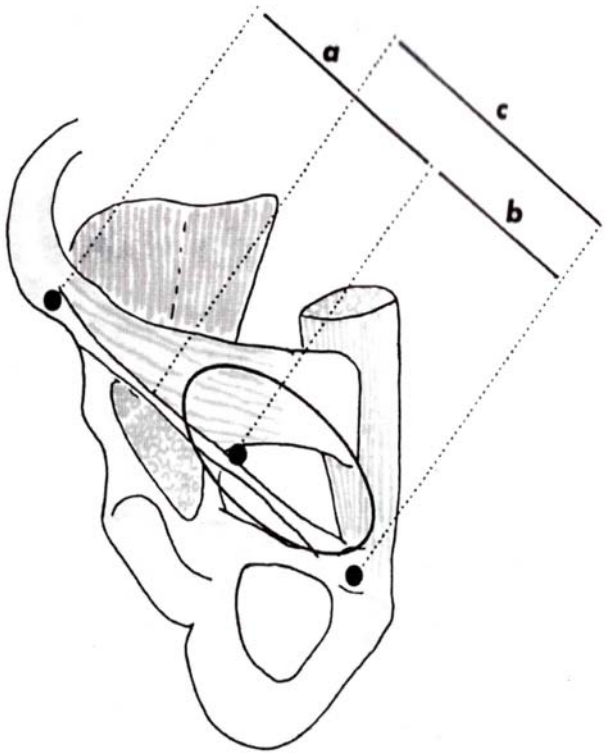

Fig. 2. Dimensions according to Trabucco: a = 7 cm. b = 5 cm, and consequently c = 8 cm

from the iliac spine to the deep inguinal orifice and from the deep orifice to the pubic tubercle are 7 cm and 5 cm, respectively. The width averages 4.5 cm. Consequently, a mesh 5-6 cm wide, with a length extending from the pubic tubercle to a point situated approximately 3 cm beyond the deep inguinal ring, i.e., 8-9 cm, is sufficient to cover the weak inguinal area, provided the patch is adequately applied and fixed (Fig. 2).

Clinical data

A large mesh is considered a sort of absolute weapon for preventing all types of recurrences by reinforcement of all potential points of herniation, including the femoral orifice. But femoral hernias are rare: 686 cases in 568,000 people over a period of 9 years (0.12%) [3]. Of 93,000 groin hernias operated on at the Shouldice Hospital, femoral hernias were present in 2,105 cases (2.3%) and associated with inguinal hernias in only 795 (0.85%) [8]. A report has shown that most recurrences are located at one site, and almost all lie in the weak inguinal area [16]. In fact, a wide overlapping of the weak inguinal area by the mesh, in order to avoid shifting of the latter, is the main reason for using a large mesh.

Mesh procedures using patches of different size provide comparable results. The rate of recurrence of the Stoppa procedure averages 1.5% [13, 20], and in large series of laparoscopic hernia repair it ranges from 1.5% to 3% [4. I I. 12]. With the techniques using a smaller patch, the rate of recurrence is lower than 1 % for the Lichtenstein method [1,9]. plug and patch procedures [6, 15, 18], and Trabucco's technique [2. 19].

A wide mesh spread in the preperitoneal space leads to two sorts of drawbacks. On the one hand, extensive dissection of the preperitoneal space induces a risk of hematomas and seromas. When these complications are collected rigorously, their incidence may reach 5% and 12%, respectively [11]. They are probably not related to the proper laparoscopic technique but to the extent of dissection necessary to spread the mesh correctly.

On the other hand, fibrosis of the preperitoneal space and adhesion of the mesh to iliac vessels and bladder can induce some difficulties of dissection in case of further surgery on these organs [21].

With the techniques of Lichtenstein [I, 9, 10,23], plug and patch [6, 10, 15, 23], and the small preperitoneal patch [17], the percentages of hematomas (0 to 2.4%) and seromas (0 to 1.9%) are lower. In the large randomized study by Liem et al. [12], the rates of hematomas were 3% and 5% for open and laparoscopic surgery, respectively, and the rates of seromas were 0 and 1 %. Complications due to adhesion of the mesh to the bladder and iliac vessels are not mentioned for small-sized meshes.

In order to avoid or minimize these problems, Stoppa, the father of the "giant prosthetic reinforcement of the visceral sac," recently advised preserving carefully the retroperitoneal spermatic sheath and umbilical prevesical fascia, which should be interposed between

mesh and viscera. Moreover, he recommended using a large preperitoneal mesh only in patients whose hernias are at high risk of recurrence and to exclude patients, suffering from vascular or urologic diseases [21]. But the incidence of these diseases increases with aging, and when we operate on a man 30 to 50 years old, we ignore what kind of disease might happen 20 to 30 years later. If the systematic use of a mesh is out of proportion in Nyhus type I and II hernias [14], it is even more so for a large mesh; and though mesh procedures are justified in types IIIa and IIIb hernias, the possible drawbacks of a large mesh should be taken into account.

Conclusion

The weak inguinal area, the site of inguinal recurrences, is small. The results provided by small patches are good and large patches provide, at best, the same results with some real drawbacks. Consequently, in most cases and particularly for indirect hernias in young patients, small patches covering only the weak inguinal area should be preferred. A large preperitoneal patch should be used only in selected cases, for hernias at high risk of recurrence, those with a wide area of weakness of the posterior wall, and moreover if they are recurrent or bilateral, in accordance with Stoppa's initial recommendations [20].

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