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Groin hernia repair via a grid-iron incision: an alternative technique for preperitoneal mesh insertion

F. Ugahary[1] and R.K.J. Simmermacher[2]

[1] Department of Surgery, Rivierenland Hospital Tiel, P.O. Box 6024, 4000 HA Tiel, The Netherlands
[2] Department of Surgery, University Hospital Utrecht, P.O. Box 85500, 3508 GA Utrecht, The Netherlands

Summary: Covering the myopectineal orifice of Fruchaud with a non-absorbable prosthesis in the preperitoneal space is a well established method for the repair of (recurrent) groin hernias. The laparoscopic extraperitoneal approach is widely used, but is a difficult technique which carries the disadvantages of high costs and the need for general anesthesia. An alternative method of placing a prosthesis of equal size in the preperitoneal space is described.

Key words: Groin hernia — Preperitoneal mesh — Grid-iron incision

Correspondence to: R.K.J. Simmermacher

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Groin hernia surgery has aroused increasing interest over the last few years, due to improvements in techniques and materials. Mahorner and Goss [1962] introduced the concept of inserting a graft in the preperitoneal space to cover the myopectineal orifice, with no attempt to close the hernial ring. This idea has been further developed by Rives [1967], Stoppa [1975], Wantz [1989] and many others. It has been demonstrated that a preperitoneal non-absorbable mesh reduces the number of recurrences even in non-specialized hospitals [Topal 1997]. Currently the laparoscopic total extraperitoneal placement (TEPP) of a mesh is a widely used method [Liem 1996], but requires general anesthesia and the necessary instruments are costly. Placement of a mesh in the same position via an alternative route under regional anesthesia with instruments in common use offers clear advantages. Such a method has been developed by one of the authors (F. U.) and is described here.

Concept

The technique to be described below places a 10 x 15 cm polypropylene mesh in the same position as in a TEPP procedure. The mesh is placed between the anterior and posterior layers of the transversalis fascia in such a way that the center of the mesh lies medial to the inferior epigastric vessels just above the inguinal ligament off the external inguinal ring. In that position the mesh covers the myopectineal orifice of Fruchaud, with sufficient overlap all around.

Instruments

Besides the standard basic instrumentation set necessary for every open hernia repair two long thin retractors (15 x 1.5 cm) and a long anatomical forceps (25 cm) are requested. In some cases a spoon-shaped device might also be useful.

Approach

One of the crucial points of this technique is the skin incision. The position of the inguinal ligament is marked by drawing a line between the anterior superior iliac spine and the pubic tubercle. The lateral margin of the rectus muscle is identified. A line is then drawn perpendicular to the inguinal ligament, starting from the

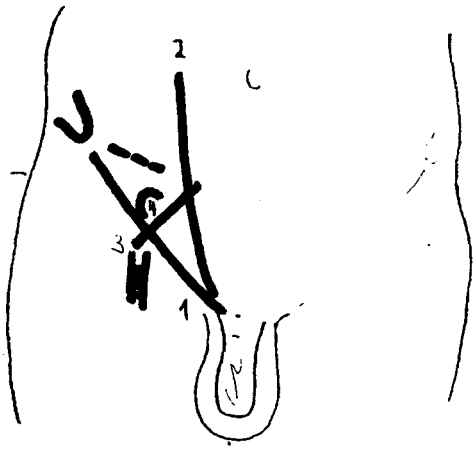

Fig. 1
Drawing showing the planning of the skin incision. The position of the inguinal ligament *(1)* is marked first, and also the lateral margin of the rectus muscle *(2)*. The inferior epigastric vessels are indicated perpendicular to the inguinal ligament starting from the femoral artery *(3)*. Lateral to these vessels and above to the inguinal ligament the internal ring is situated *(4)*. The skin incision is made about one finger's breadth above and lateral to this

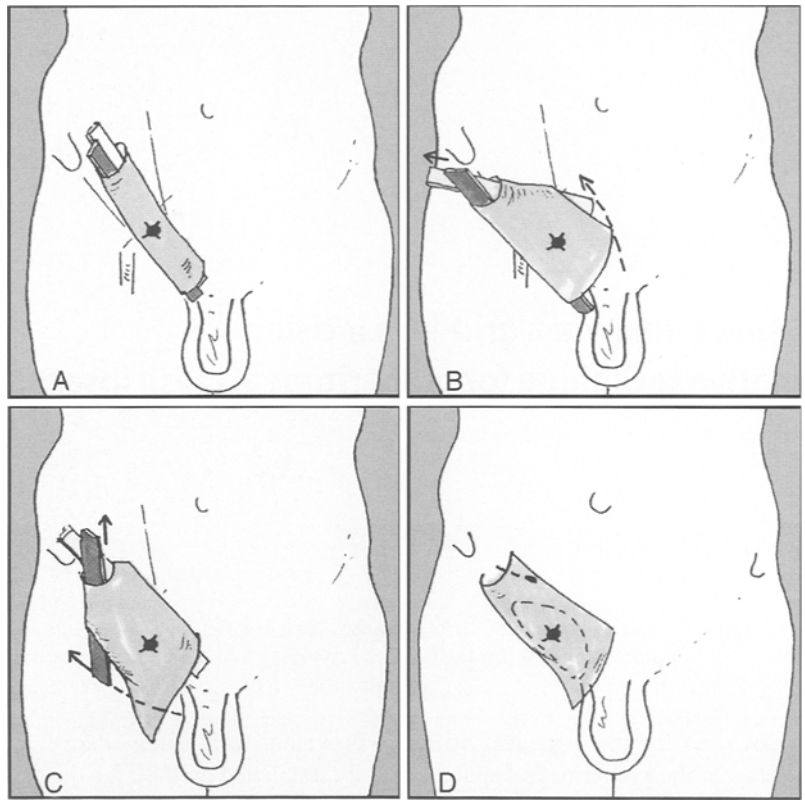

Fig. 2 a-d
Ventral view of the right groin after insertion of the rolled up prosthesis and changing the forceps for two retractors **(a)**. The lower retractor fixes the mesh against the pubis while the upper retractor is turned craniolaterally to stretch out the mesh **(b)**, the upper retractor fixes the mesh against the abdominal wall and the lower one is turned downwards and laterally **(c)**, final position of the prosthesis, seen from ventral **(d)**

femoral artery which is easily palpated. This line indicates the position of the inferior epigastric vessels. The internal inguinal ring lies just lateral to the inferior epigastric vessels and above the inguinal ligament. The skin incision is made about one finger's breadth above and lateral to the internal inguinal ring and should be slightly oblique and about 3 to 4 cm long. The incision does not cross the lateral margin of the rectus muscle (Fig. 1). The external oblique aponeurosis is then divided along the line of its fibers and a grid iron approach is used down to the peritoneum.

Technique

Once the preperitoneal space is identified the patient is put in a Trendelenburg position and turned slightly over to the opposite side. The preperitoneal space is developed by blunt dissection of the peritoneal sac from the abdominal wall, using a swab. The inferior epigastric vessels are identified but should not be separated from the abdominal wall. Progressing medially, the inguinal ligament and the symphysis are identified. This will reduce a direct groin hernia. The cord structures should then be examined for the presence of either a preperitoneal lipoma or an indirect hernial sac. If an indirect sac is present, it should either be removed from the inguinal canal or divided at the level of the anterior abdominal wall closing the proximal defect with a purse string suture. The peritoneal sac should be separated from the cord over a length of at least 7 cm because the cord will be parietalized. A space is thus created in which the symphysis, the inguinal ligament, ilioinguinal tract, inferior epigastric vessels, external iliac vessels, spermatic cord and psoas muscle are easily identified. This may be facilitated by using the long retractors for exposure. A 10 x 15 cm polypropylene mesh, of which the center is marked with a coloured stitch and the corners are rounded off, is rolled up on a 25 cm long forceps and introduced into the preperitoneal cleavage space in such a way that the center of the mesh lies medial to the epigastric vessels and just above the inguinal ligament. The forceps is then removed and the first retractor re-introduced in such a way that the mesh is fixed by the tip of the retractor to the pubic bone. The second retractor is introduced next to the first (Fig. 2a.) and turned in a cranial direction to spread the mesh between the anterior abdominal wall and the peritoneal sac (Fig. 2b). The second retractor then fixes the mesh to the

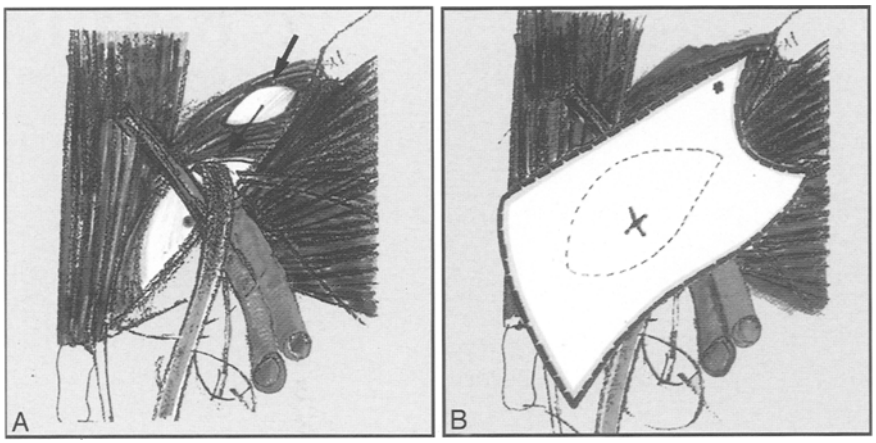

Fig. 3a, b
Dorsal view of the right groin showing the myopectineal orifice of Fruchaud as well as the muscle splitting incision *(arrow)* **(a)**. Final position of the prosthesis seen from the inside indicating coverage of the myopectineal orifice with a wide overlap **(b)**

abdominal wall without much force while the first retractor is turned caudally and dorsally in order to spread the mesh over the iliac vessels and the psoas muscle (Fig. 2c). At that point care must be taken to ensure that the cord is lateralized between the mesh and the anterior abdominal wall without involving the peritoneum.

The position of the mesh is now checked. The retractors are then removed and the lateral corners of the mesh folded out with a forceps. The mesh is fixed at the lateral corner of the incision to the transversus muscle with an absorbable suture. The external oblique aponeurosis and the wound are closed in the usual way.

Discussion

Direct groin hernia repair using a preperitoneal mesh is nowadays an accepted method of treatment. The extraperitoneal laparoscopic approach has so far shown good results, but the need for general anesthesia and its high costs are important drawbacks.

The technique described above serves as an alternative approach which can be carried out under regional anesthesia and is probably cheaper. So far the authors have performed more than 250 operations, most of them under regional anesthesia, without major complications. The few recurrences were due to technical problems at the beginning of the series. This technique is applicable to primary, recurrent and bilateral groin hernias. In contrast to the laparoscopic approach intra-operative difficulties can be easily controlled by lengthening the incision. We feel that this approach has the advantages of preperitoneal placement of a non-absorbable prosthesis covering the myopectineal orificium of Fruchaud (Fig. 3a, b) while avoiding the problems and costs of the laparoscopic procedure. To evaluate the role of this technique a randomized trial has been set up.

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