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Inguinal hernia: preperitoneal placement of a memory-ring patch by anterior approach. Preliminary experience

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Abstract The aim of this prospective study was to set up and evaluate a technique allowing, by the mean of a memory ring, easy placement of the patch in the preperitoneal space (PPS), directly via the hernia orifice, so as to associate the advantages of the preperitoneal patch, anterior approach and minimally invasive surgery. The memory-ring patch was made by basting a PDS cord around a 14×7.5 cm oval shaped polypropylene mesh. The hernia sac was dissected, blunt dissection of the PPS was carried out through the hernia orifice and the patch was introduced in the PPS via the orifice. Spreading of the patch in the PPS was facilitated by the memory-ring. One hundred and twenty nine hernias, classified as Nyhus Type IIIa, IIIb and IV, were operated on 126 patients; 11 were big pantaloon or sliding hernias. The anesthesia was spinal in 116 cases and local in 10 cases. There were three benign postoperative complications (2.3%) related to the hernia repair. Ninety six percent of the patients were evaluated with a mean follow up of 24.5 months (12–42). Two recurrences (1.6%) occurred, 7 patients (5.6%) felt some degree of light pain, but not any case of disabling pain was observed. This technique offers many advantages. It is tension-free and almost sutureless. The patch is placed in the PPS through the hernia orifice without any remote opening in the abdominal wall. The patch applied directly to the deep surface of the fascia reinforces the weak inguinal area by restoring the normal anatomic disposition. The good preliminary results are encouraging and justify further randomized evaluation.

Keywords Inguinal hernia · Preperitoneal space · Preperitoneal repair · Prosthetic repair · Inguinal approach

Introduction

The advantages of the patch in the preperitoneal space (PPS) have been advocated by pioneers [1–3] and this location has been since adopted by laparoscopic surgeons. Laparoscopic hernia repair induces less chronic pain than open surgery [4, 5]. This advantage may be explained by the preperitoneal location of the patch and the absence of dissection of the superficial anatomical planes of the groin. Unfortunately, laparoscopic hernioplasty may induce a risk of rare but serious complications [5] and a higher risk of recurrence, when the surgeons are not highly expert in laparoscopy [6]. The anterior traditional inguinal approach offers some other advantages: it is the most commonly known, easily reproducible and feasible under local or regional anaesthesia. Consequently, placement of the patch in the PPS by inguinal approach might associate the advantages of both the methods. The techniques set up by Rives in France and Read in the USA provide a strong repair [7, 8], but are not widely used today, since they are more technically demanding than the Lichtenstein or the plug techniques. Gilbert developed, by another way, an interesting concept: the “umbrella plug” was cone shaped to facilitate introduction through the hernia orifice and the patch was unfolded and spread flat in the PPS [9]. Unfortunately, correct spreading of the patch is difficult, due to the flexibility of the mesh. More recently, the concept of a mesh, endowed with some memory of shape, to facilitate placement of the patch by a short posterior approach, was introduced by Kugel [10].

The aim of this prospective study was to set up and evaluate a technique allowing, by means of a memory ring, easy placement of the patch in the PPS directly via

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the hernia orifice, so as to associate the advantages of the preperitoneal patch, anterior approach and minimally invasive surgery.

Patients and methods

Patients

Informed consent for the use of a PDS-cord memory-ring was obtained from 126 patients of mean age 60 years (27–84), operated on 129 hernias from January 2002 to July 2004.

Patch

The memory-ring patch was made by the surgeon at the operation: an oval shaped patch measuring 14×7.5 cm was tailored in a 15×7.5 cm polypropylene mesh (Bard-Davol Inc USA) and a PDS-cord (Ethicon Inc USA) was basted around the mesh (Fig. 1).

Operative technique

The operation was performed under spinal or local anesthesia. An inguinal incision 4–5 cm long was performed, external oblique aponeurosis was divided, the cord was lifted on a tape, the cremaster was divided around the internal orifice, but not stripped, and the sac was dissected. The technique of placement of the prototype was adapted to the type of hernia.

In indirect hernias high dissection of the sac was performed and the sac was thus reduced in the PPS through the internal ring. Epigastric vessels were identified and the margins of the internal orifice were cleared. Blunt dissection was carried out in the PPS, through the internal orifice, 3–4 cm beyond its margins, and was then extended deep to epigastric vessels and transverse fascia, in the direction of the pubic spine, beyond its



Fig. 1 PDS-cord basted around the patch

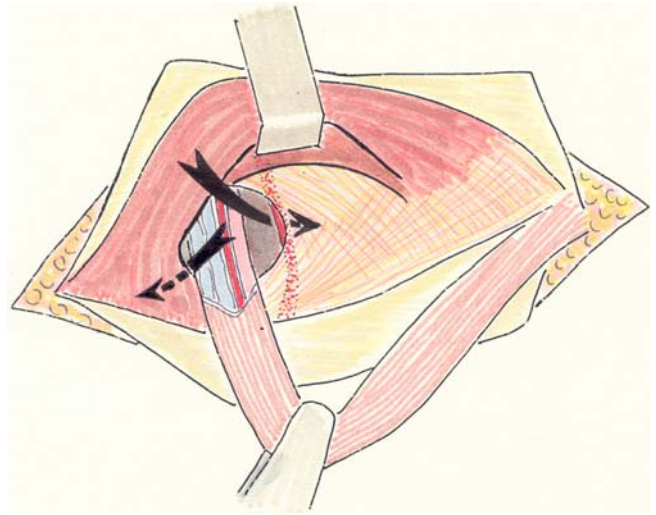


Fig. 2 Indirect hernia: dissection carried out through internal orifice

level (Fig. 2). The dissection was carried out in contact with the deep surface of the fascia, using a blunt curved Rochester forceps and completed with the finger. The patch was split at one extremity and introduced in the PPS via the internal orifice. Asking the patient to strain and pushing on the PDS ring with the finger allowed correct spreading of the patch, which was applied to the deep aspect of the fascia. The branches of the split mesh were crossed each other, so as to create a tie around the cord, and placed at the deep surface of the fascia (Fig. 3). They were then fixed by one stitch taking successively the internal oblique and transverse muscles from superficial to deep surface, both branches of the patch and again the muscles from deep to superficial surface. The assessment was done by asking the patient to strain and to cough. External oblique aponeurosis was repaired superficial to the cord so as to restore the normal anatomy.

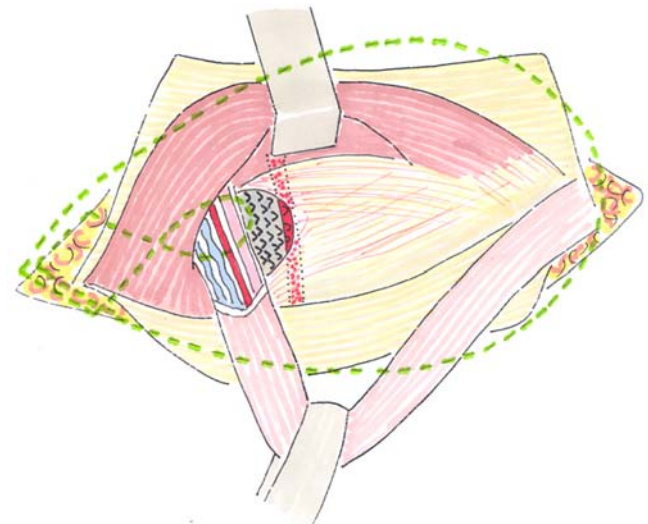


Fig. 3 Indirect hernia: the patch in place

In direct hernias, after division of the cremaster so as to check the internal orifice for an indirect sac, the transverse fascia was divided circularly around the hernia bulge and the sac was reduced. Blunt dissection was carried out in the PPS, medially in the direction of the pubic spine and laterally behind the epigastric vessels in direction of the iliac spine (Fig. 4). The patch was not split. It was introduced through the transverse fascia opening and spread in the PPS so as to cover all the weak inguinal area (Fig. 5). When an indirect sac, even if it was small, was associated to the direct one, both sacs were dissected and reduced.

Evaluation

Peroperative data and postoperative events were prospectively recorded. The hernias were classified according to Nyhus classification [11]. A questionnaire was sent

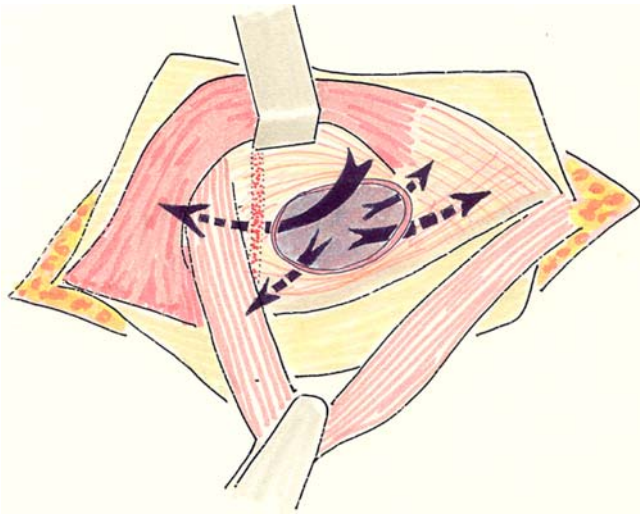


Fig. 4 Direct hernia: dissection carried out through the fascia orifice

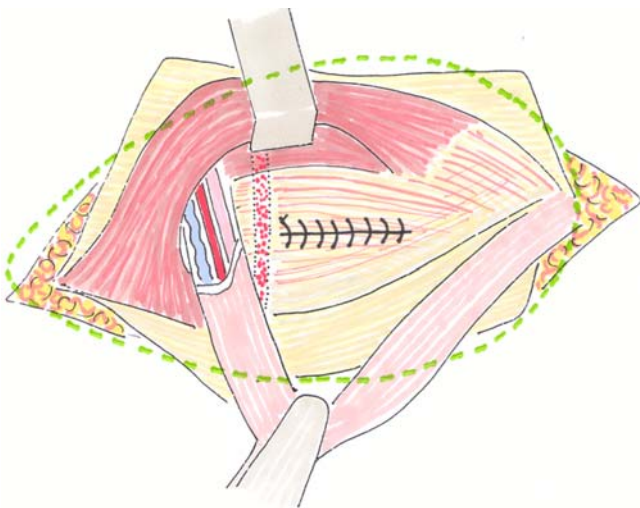


Fig. 5 Direct hernia: the patch in place

to the patients in August 2005, asking for recurrence, reoperation, chronic pain or any other side effect and proposing a free physical examination at the surgeon's office. When the questionnaire was not returned the patient was joined by telephone. The outcome parameters were recurrence, chronic pain and postoperative complications.

Results

The hernias were classified as IIIa in 39 cases (30%), IIIb in 76 cases (59%) and IV in 14 cases (11%); 11 of the 76 IIIb (14.5%) were sliding or pantaloon hernias. The anesthesia was spinal in 116 cases and local in 10 cases. Six patients were operated on day case surgery, 103 overnight; 16 were discharged on postoperative day 2 in the morning because they were elderly and had serious associated diseases or lived far from the hospital. One patient was discharged on day 5 due to a complication not related to the hernia repair (a prostate biopsy performed by the urologist at the end of the hernia repair was complicated by a severe hematuria, which required supra-pubic catheterization for 5 days). There were three benign postoperative complications (2.3%) related to hernia repair: one bleeding from the skin suture requiring re-suture, one subcutaneous hematoma which did not require drainage and one case of pain for more than 8 days. The mean follow-up was 24.5 months (12–42). Thirty-four hernias (26.4%) were controlled by physical exam at the surgeon's office, 86 by answering the questionnaire and 4 by telephone. Four patients were dead, 1 was lost to follow-up and finally 124 hernias (96%) were evaluated. Seven patients of 124 (5.6%) felt some degree of pain described as foreign body perception in two cases, light pain at effort without any disability in a forester and light pain or irritation not related to effort in four cases. Not any case of severe disabling pain was observed. Testicular atrophy was not observed. There were two recurrences (1.6%). Both were indirect hernias which occurred after repair of primary direct hernias and can be considered in fact as missed hernias.

Discussion

Our results demonstrate that this technique of preperitoneal patch by anterior approach provides a low rate of recurrence (1.6%) though all hernias of the series involved weakness of the posterior wall (Nyhus III or IV), a low risk of postoperative complications (2.3%) and a low incidence of moderate chronic pain (5.6%) without any case of disabling pain.

This technique was set up in order to associate the advantages of both the preperitoneal patch and anterior approach. Location of the patch in the PPS offers some advantages: contrary to onlay-mesh techniques the patch is applied to the abdominal wall by intra-

abdominal pressure, so that fixation sutures are not necessary and the patch is not in contact with the ilioinguinal and iliohypogastric nerves. Anterior approach is the most commonly known, is feasible under local or regional anesthesia and permits to adapt the technique to anatomic lesions, since as stated by Nyhus [12], a prosthetic repair may not be justified for Type II hernias. On the contrary, the techniques of posterior open or laparoscopic approach involve the unavoidable use of a mesh. In our series the technique was applied only to type III and IV hernias. The effectiveness of the Rives-Read technique is established [7, 8], but this technique is technically demanding, necessitates a long incision of the transverse fascia, a wide dissection and many sutures. A simplified technique of placement of the patch in the PPS by inguinal approach proved to be effective, but spreading of the patch was not easy as the mesh was too flexible, a long incision of the fascia and many stitches were necessary [13]. In the Kugel technique [10], handling of the patch, which is placed by a short abdominal incision, is facilitated by the relative rigidity of the patch, provided by its thickness and a memory-ring. In our technique the memory-ring, made of a PDS cord fixed to the periphery of the mesh, facilitates spreading of the patch, when the latter has been introduced in the PPS through the hernia orifice. The originality of our technique consists indeed of limiting the dissection to the hernia sac and introducing the patch through the hernia orifice, without a long opening in the fascia and without any remote orifice in the abdominal wall.

In the indirect hernia high dissection of the sac is performed, the sac is thus reduced and blunt dissection of the PPS is extended through the deep orifice, so as to create a pocket for the patch. The patch is split and the two branches surrounding the spermatic cord are placed at the deep aspect of the transverse muscle. While the patient is asked to strain so as to exert a counterpressure, perfect spreading of the patch is achieved by pushing on the memory-ring with the finger. The patch is fixed by a single stitch of absorbable material, taking the entire thickness of the oblique and transverse muscles from superficial to deep surface, both branches of the patch and thus again the muscle from deep to superficial surface. This technique reconstitutes a new internal orifice in a really deep location and prevents the risk of an eventual interstitial recurrence, which was pointed out recently with the Lichtenstein [14]. Moreover, the oblique course of the spermatic cord and the normal anatomic settings are restored. The bayonet course of the cord contributes indeed in preventing indirect recurrence: the Halsted technique, consisting of suturing the external oblique aponeurosis flaps behind the cord, provided a solid posterior wall, but exposed to indirect recurrence [15]. On the contrary, indirect recurrences are extremely rare with the Shouldice technique, which restores the oblique course of the cord: only 12 recurrences were indirect on 459 recurrences observed after 78,063 repairs performed at the Shouldice Hospital from 1945 to 1970 [16].

In the direct hernia the transverse fascia is incised circularly at the base of the sac, blunt dissection of the PPS is carried out through the orifice in the fascia, the patch is introduced via this orifice, spread flat and applied to the deep surface of the fascia. The fascia is repaired by a continuous suture taking the patch. The two recurrences in our study (1.6%) were indirect and occurred after repair of primary direct hernias: they may be considered in fact as missed hernias. In case of an obvious big direct hernia there is a risk of treating only this hernia and omitting to look for an indirect sac. In order to avoid this cause of failure, careful checking of the internal ring, by division of the cremaster around the orifice, and asking the patient to cough is mandatory, as it is for the Shouldice technique. If an indirect sac is present it should be dissected and the patch should be placed through the internal orifice as previously described.

The technique proved to be effective in 11 big sliding or pantaloon hernias. In case of a pantaloon hernia, dissection of both sacs is performed and a hole joining the direct and indirect areas is created, epigastric vessels may or may not be divided and a wide patch covering the whole area is placed so as to reconstitute a strong posterior wall. Only 26.4% of the patients were controlled by physical examination. We know that the real recurrence rate may be higher than two cases. But this possible bias is difficult to avoid and is present in most evaluations of hernia repair, since when the patients feel well they do not easily accept traveling for a control.

The best anesthesia for this technique is regional anesthesia, which provides the best comfort for the patient and the surgeon. It allows coughing to facilitate identification of a small indirect sac and straining, which helps to spread the patch in the PPS. Local anesthesia is possible if the surgeon is experienced; we used it in ten cases, mainly in elderly people. Dissection of the PPS medial to epigastric vessels is very easy, since this space is not very sensitive to pain and this contributes to the good tolerance of the patch. Dissection lateral to epigastrics may be less comfortable due to traction on the peritoneum, which at this level can be more adherent to the fascia.

This technique, like all other mesh techniques, is tension-free and it is almost sutureless: in the direct hernia the fascia is simply approximated and in the indirect one the patch is fixed by one stitch only in most cases. One or two additional stitches are sometimes necessary, depending on the cough and strain test. Contrary to the onlay mesh techniques, this technique does not involve extensive dissection of the superficial plane, which is very sensitive to pain; the ilioinguinal and iliohypogastric nerves are not in contact with the patch and may be safely preserved. In our experience postoperative pain seemed moderate. Though this study did not involve a systematic evaluation of pain, short hospital stay constitutes an indirect argument, since in our country ambulatory surgery is not in current practice and a hospital stay of 3–4 days is usual. Postoper-

ative complications were rare and benign. Preperitoneal hematoma was not observed, since the plane of dissection in close contact with the fascia is avascular.

The rate of chronic pain, which was prospectively evaluated in this series, was only 5.6% and no cases of severe disabling pain were observed. According to a recent review [17] about 20% of patients are affected by chronic pain after groin hernia repair and in about 12% the pain is intense enough to impair daily activity. It is generally admitted that laparoscopy induces less chronic pain than open repair [4, 5]. A postal enquiry [18] in patients operated by TEP or Lichtenstein techniques showed that the incidence of chronic groin pain and chronic discomfort were 4.2 and 18.3%, respectively, after TEP versus 11.2 and 27.1% after Lichtenstein. The low percentage of chronic pain in our series may be explained, as for laparoscopy, by the preperitoneal location of the patch far from the superficial nerves, by the limited dissection of the superficial planes and the absence of extended suturing or staples. This technique is a good alternative to laparoscopy for placement of a patch in the PPS, since the anterior approach is easily reproducible with few postoperative complications (2.3% in our series), whereas laparoscopy is technically difficult, induces a higher risk of recurrence [6] and a risk of rare but serious complications [5].

In conclusion this technique offers many advantages. It is tension-free and almost sutureless. The operation is performed under regional or local anesthesia. The patch is placed in the PPS through the hernia orifice without any remote opening in the abdominal wall. The patch applied directly to the deep surface of the fascia reinforces the weak inguinal area by restoring the normal anatomic setting. These good preliminary results are encouraging and justify further evaluation, especially randomized.

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