Open Preperitoneal Mesh Repair of Recurrent Inguinal and Femoral Hernias

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Abstract

Recurrences of inguinal hernias are a not infrequent problem seen by the surgeon. Usually, repair of these hernias is technically more demanding than the original repairs, with potential for a new recurrence, and a higher risk of complications. Open preperitoneal placement of prosthetic mesh is an effective method of repair for such recurrences. It can easily be performed, using epidural or caudal anesthesia, in the intact preperitoneal space, with extremely low recurrence rates, low morbidity, and high patient satisfaction. We present our experience with this technique in 27 patients during a 7-year period. Mean follow-up was 45 months. The procedure was safe (no significant early and late morbidity) and achieved a safe repair (no recurrence during the follow-up period).
Key Words: Inguinal hernia, recurrence, mesh, tension-free repair, recurrent inguinal hernia.

Introduction

ABOUT A CENTURY AGO, Bassini established the era of modern anatomic hernia surgery (1). Yet despite subsequent advances and refinements of surgical techniques and materials used, recurrences have remained a significant problem. In an attempt to reinforce the repairs and prevent recurrences, surgeons have used many autologous tissue techniques, and homologous and heterologous tissue biomaterials (2). Polyethylene was first proposed by Usher in 1959, to repair tissue defects of the chest and abdominal wall (3). Since that time, there has been intense interest in the use of polypropylene and other synthetics for plastic hernia repair. This interest grew during the last decade of the 20th century, probably as a result of the reports by Stoppa et al. (4, 5), as well as the innovation of laparoscopic hernia repair, in which mesh is routinely used (6, 7). The preperitoneal approach, using a prosthetic mesh, is an attractive method for repairing recurrent inguinal hernias, since it offers many theoretical advantages, such as strength, tension-free repair, optimal surface area for tissue incorporation, and positioning of the mesh in the intact preperitoneal space. In this article, we review our experience with this method in 27 patients.

Patients and Methods

From June 1995 through February 2002, 27 patients (26 males and 1 female) underwent tension-free repair of recurrent inguinal hernias (26 males) and a recurrent femoral hernia (the female patient) with the polypropylene mesh (Surgi-Pro®), using the open preperitoneal approach. Median patient age was 65 years (range: 45–78 years). All the male patients had had their inguinal hernias originally repaired by the Bassini technique, while the female patient had had a femoral hernia repair using the below-the-inguinal-ligament approach. One patient had had bilateral inguinal hernias. In another patient, the inguinal hernia had recurred twice. All patients had their original surgery under epidural anesthesia.

Surgical Technique

The procedure is performed with patient under epidural or caudal anesthesia. A Foley catheter is

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inserted just before the operation, especially in elderly patients. The incision is made slightly above the incision used in the conventional anterior (inguinal canal) repair. It begins just lateral to the midline, approximately 2 cm above the pubic tubercle, and is directed to a point about 1 cm superior to the projected location of the deep inguinal ring. The incision must be made so that it is slightly above both the deep inguinal ring and the hernia defect. The anterior rectus sheath is transversely incised. This incision is carried laterally, incising the aponeurosis of the external oblique, separating the internal oblique and the transversus muscles in the line of their fibers, and opening the transversalis fascia. The underlying peritoneum is not opened. The inferior epigastric vessels are ligated, since this allows a wide exposure of the preperitoneal space and greatly facilitates appropriate mesh placement. By retracting the pelvic peritoneum and preperitoneal fat away from the posterior inguinal wall, the hernia is easily recognized and reduced after the identification of the vas deferens and the spermatic blood vessels. The hernia defect is left unsutured. The femoral vessels are easily identified. A small opening is made on the mesh to accommodate the spermatic cord and vessels (Fig. 1). The next step is the placement of the mesh. Prolene® sutures (no. 2-0 or 3-0) are placed in the pubic tubercle, in the Cooper's ligament, and then along the iliopubic tract to the iliopectineal arch, and left untied. These sutures are then passed at the lower border of the mesh, left untied, and held in hemostats. The mesh is then anchored in place by tying the sutures (Figs. 2 and 3). The external oblique aponeurosis is elevated in the superior part of the incision, thus exposing the internal oblique muscle. The medial, superior, and lateral borders of the mesh are then anchored in the musculofascial

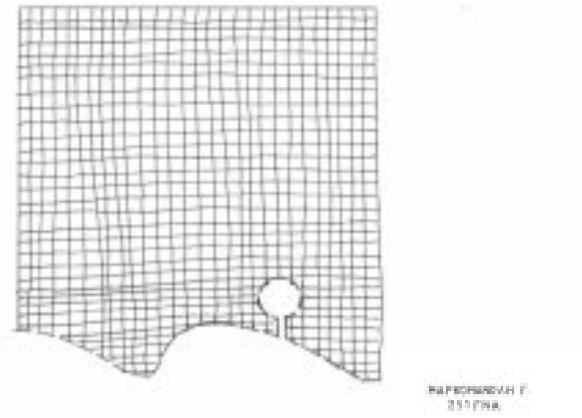

Fig. 1. A small opening is made on the mesh to accommodate the spermatic cord and vessels.

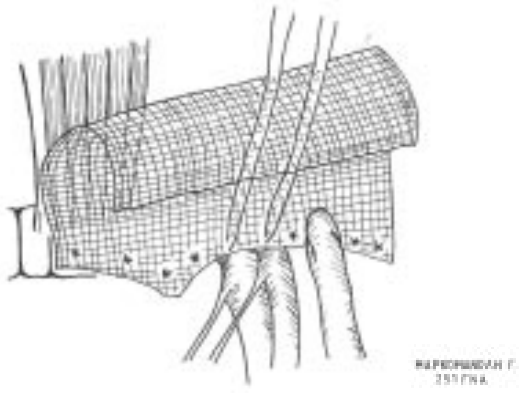

Fig. 2. Prolene sutures are placed in the pubic tuburcle, in the Cooper's ligament, and then along the iliopubic tract to the iliopectineal arch and left untied.

abdominal wall by mattress sutures of 2-0 Prolene, which are placed through the full thickness of the musculofascial wall, the prosthesis, and then again through the muscular abdominal wall (Figs. 3a and 3b). A "bite" of about 1 cm of tissue is included in these mattress sutures. A closed suction drain is placed on the surface of the prosthesis and is then extracted through a stab wound.

Results

The hospital stay for the procedure was 1–3 days (mean: 1.4 days). None of our patients experienced significant early morbidity postoperatively. In the patient with bilateral hernia repair, a

Figs. 3a and 3b. The mesh is anchored by suturing the previously placed sutures.

macroscopic hematuria was observed on the day of surgery; it resolved spontaneously and was attributed to the maneuvers (pressure) on the urinary bladder during surgery. All patients were mobile by the evening of the day of surgery. The Foley catheter was removed immediately after surgery or on postoperative day 1. Pain was minimal in all patients and was easily controlled by the use of sim-

ple, non-opioid analgesics (paracetamol). The drain was removed just before the patient was discharged. Patients returned to their usual activities approximately ten days following surgery. They were instructed to avoid lifting excessive weight (> 10 kg) for at least one month. Follow-up for 22 of the patients was completed by clinical examination. Mean follow-up period was 45 months (range: 1–74 months) (Fig. 4). There was no hernia recurrence during this period. None of the patients examined at follow-up experienced late morbidity (such as neuralgia).

Discussion

Stoppa in France described the concept of preperitoneal, tension-free placement of prosthetic mesh in the surgical repair of inguinal hernia in the 1970s (4). Since that time, the use of prosthetic materials has increased rapidly. There is evidence that in adult patients with inguinal hernia, a metabolic defect in collagen synthesis is involved. Therefore, the wound requires the tensile strength of the mesh to achieve a strong repair. This is especially important in recurrent hernias. Unfortunately, the ideal mesh prosthetic is yet to be found. Existing data suggest that absorbable mesh does not remain in the wound long enough for adequate collagen to be deposited (8). Multi-filament mesh can harbor bacteria in spaces too small for normal body mechanisms to eliminate them. Mesh that fibroblasts cannot adhere to and infiltrate does not lead to the desired strengthening of the inguinal wall. Monofilament mesh is the most popular presently in use, with the various types of polypropylene having different characteristic advantages (8–10).

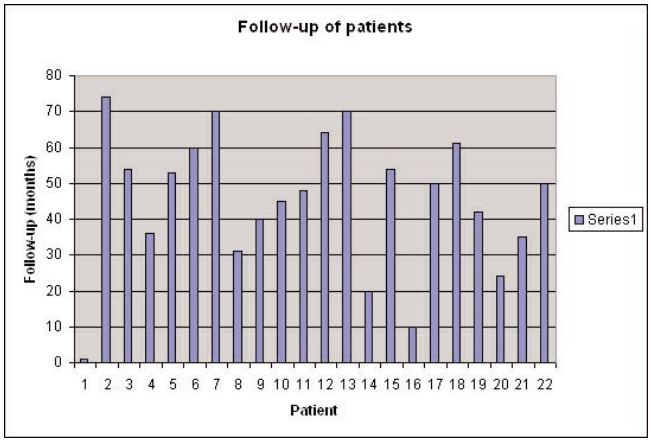

Fig. 4. Follow-up for each of the 22 patients. Although late recurrences are seen, most take place within the first 2 years following repair. As illustrated in this diagram, the follow-up was > 24 months for 19 patients.

Despite the problem of not yet having the ideal material, the method itself offers many theoretical advantages (4, 5, 11):

1. By preserving the hernia sac, a layer of viable autogenous tissue persists to serve as a barrier between the prosthesis patching the defect and the intraperitoneal contents, thereby minimizing the incidence of fistula or bowel obstruction.
2. Intraparietal placement of the prosthesis allows well-vascularized, soft tissue coverage of all aspects of the prosthesis.
3. Use of porous mesh (polypropylene) allows a large surface area for in-growth of connective tissue, leading to permanent fixation of the prosthesis within the abdominal wall.
4. With the preperitoneal placement of the mesh, intra-abdominal pressure tends to hold the mesh in place against the posterior surface of the anterior abdominal wall (in contrast to the on-lay technique).
5. This technique is a tension-free method that patches the defect rather than attempting to close it by re-approximating fascia edges under tension.
6. Finally, from a technical point of view, the preperitoneal space is typically intact during repair of recurrent hernias, and this greatly facilitates the procedure.

The patients are easily mobilized not long after the surgery, generally on the same day. Postoperative pain is minimal, mainly due to the absence of tension in this type of hernia repair. And the procedure is associated with minimal morbidity. Possible complications include seroma, hematoma, infection, and neuroma. The first two can be prevented by meticulous hemostasis and by the placement of a closed suction drain at surgery. Other potential complications, such as injury to the bowel or bladder, can usually be avoided by careful dissection during repair.

Endoscopic repair of recurrent inguinal hernia is another alternative technique, which also achieves satisfactory results (12, 13). However, this approach requires significant experience in laparoscopic surgery. General anesthesia is also required, and this may be a problem, especially for patients with significant co-morbidity.

In the era of tension-free inguinal hernia repair using prosthetic meshes, recurrences are much less common than in the past. In our department, the Lichtenstein technique is the preferred method for inguinal hernia repair (14, 15). However, when facing a patient with a recurrent inguinal hernia, the

surgeon should bear in mind that preperitoneal, open, tension-free repair using a polypropylene mesh is a simple and effective method, with extremely low recurrence rates, low early and late morbidity, and high patient satisfaction. The preperitoneal space is typically unaltered, and this is the main advantage of this approach. The recently proposed "mesh and plug" technique is a relatively easy, safe, and effective alternative method for the management of recurrent inguinal hernias, using the tension-free technique and double mesh (P.H.S., Prolene Hernia System) (16). In recent years, we have used both of these techniques with excellent results and high patient satisfaction. However, "mesh and plug" is a more complicated technique, which requires dissection and identification of the spermatic cord and its vessels and therefore may be technically demanding, especially following multiple repairs of recurrent inguinal hernias. These problems can be avoided by using the open preperitoneal mesh repair method.

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