Inguinal Hernia Repair via Application of Mesh in Front of and behind the Fascia Transversalis

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Abstract The aim of this study was to compare mesh placement in front of the fascia transversalis and behind the fascia transversalis via inguinal incision. We evaluated the results of 106 inguinal hernia cases treated with polypropylene mesh applied via the anterior approach between December 2004 and January 2010. Using the anterior approach, the mesh was placed preperitoneally behind the fascia transversalis in 51 of the patients, whereas in the other 55 patients the mesh was placed in front of the fascia transversalis. Mean duration of surgery was shorter in the patients in which the mesh was placed behind the fascia transversalis (60 min vs. 75 min) ($P<0.05$). In all, 8 patients (7.5%) had postoperative complications, including hematoma ($n=4$), seroma ($n=2$), scrotal edema ($n=1$), and orchitis ($n=1$). There weren't any significant differences in the complication rate between the 2 groups of patients ($P>0.05$). During a mean 44-month follow-up period (range: 12–72 months), no recurrence was observed. In conclusion, there weren't any significant differences between the 2 methods of inguinal hernia repair, other than the duration of surgery.

Keywords Inguinal hernia · Anterior approach · Hernia repair with mesh

Introduction

The hernia recurrence rate is 1.4–22 % in patients in whom repair is made without the use of mesh [1–4], whereas the use of mesh reduces this rate to ≤ 1 % [5–8]. Repair of inguinal hernias with mesh was first reported by Usher in 1958 [9, 10]. The technique has gained widespread acceptance due to its advantages, including the fact that there is no tension, there is less pain, which facilitates more rapid recovery, and the rate of recurrence is lower, as compared to other techniques.

Many methods that utilize mesh via anterior and posterior approaches have been described for the repair of hernias. Currently, Lichtenstein, Stoppa, and Kugel frequently use such methods as laparoscopic intraperitoneal and extraperitoneal inguinal hernia repair [5–8]. In our clinic, hernia repair is performed via the anterior approach, placing mesh either in the front of the fascia transversalis (Lichtenstein method) or behind it.

This study aimed to compare postoperative complications and recurrence rates in patients treated with two hernia repair methods: mesh placement in front of the fascia transversalis via inguinal incision (Lichtenstein method) and mesh placement behind the fascia transversalis via inguinal incision.

Materials and Methods

The study included 106 male patients who underwent inguinal hernia repair with polypropylene mesh (Prolene, Ethicon, Inc., Cincinnati, OH) via the anterior approach between December 2004 and January 2010. The mean age of the patients was 60 years (range 19–76 years). Hernia typology was determined according to Gilbert classification, as modified by Rutkow and Robbins [1] (Table 1).

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Table 1 Gilbert classification, as modified by Rutkow and Robbins

Type 1: The internal inguinal ring is narrow. The hernia sac can be any size.
Type 2: The internal inguinal ring is moderately wide, but not >4 cm.
Type 3: The internal inguinal ring is >4 cm. The hernia sac also has a scrotal component.
Type 4: The base of the inguinal channel is weak.
Type 5: The presence of suprapubic direct diverticular defect.
Type 6: The inguinal hernia has both a direct and indirect component.
Type 7: Femoral hernia

In total of 106, 18 patients were administered general anesthesia, 64 received spinal block, and 24 received epidural anesthesia. Inguinal oblique incision was performed in all the patients—in 51 (48 %) patients the mesh was placed preperitoneally behind the fascia transversalis and in 55 (52 %) patients the mesh was placed in front of the fascia transversalis (Lichtenstein method). All the patients were administered the first strip of prophylactic cephalosporin. Two repair methods were compared in terms of surgical outcome and the chi-square test was used for statistical analysis.

Surgical Technique

In patients in whom the mesh was placed behind the fascia transversalis, the external oblique fascia muscle was opened following an incision in the skin, and then the cord was suspended. In indirect hernia cases the hernia sac was excised following high ligation, whereas in direct hernia cases the loose fascia transversalis on top of the hernia sac was excised. For both types of hernia, the preperitoneal region was accessed via opening the fascia transversalis, which separates the back wall of the inguinal channel from the inner circle toward the pubis. A keyhole-shaped recess was made for placement of the mesh on the peritoneum, and thereafter it was affixed to the Cooper's ligament. It was sutured to the iliopubic tract and the tendon conjoint from behind using 2-0 Prolene sutures. The edges of the fascia transversalis above the mesh were also sutured using 2-0 Prolene sutures. As such, contact between the mesh and the cord was prevented. For cases in which the mesh was placed in front of the fascia transversalis, the hernia sac was excised following high ligation (indirect hernia), whereas in cases of direct hernia the hernia sac was inverted without being opened, and after making a recess for the mesh cord and placing on the fascia transversalis, it was sutured to the inguinal ligament and the tendon conjoint using 2-0 Prolene sutures.

Results

According to the Gilbert classification system, as modified by Rutkow and Robbins [1], type distribution of the 106 hernia cases was as follows: type 4 ($n=40$), type 3 ($n=29$), type 6 ($n=23$), type 2 ($n=13$), and type 7 ($n=1$). In all, 98 hernia cases were primary and 8 were recurrences. Mean duration of surgery was 60 min when the mesh was placed behind the fascia transversalis, versus 75 min when the mesh was placed in front of the fascia transversalis. As such, the difference in surgical duration between the two methods was statistically significant ($P<0.05$). In terms of mean duration of hospitalization, there was not a significant difference between the two hernia repair methods (mesh behind the fascia transversalis: 2.2 days; mesh in front of the fascia transversalis: 2.4 days) ($P>0.05$).

In all, 8 patients (7.5 %) developed complications. Among the patients in whom the mesh was placed in front of the fascia transversalis, postoperative complications were as follows: hematoma at the site of the incision ($n=2$), seroma ($n=2$), and scrotal edema ($n=1$). Among the cases in which the mesh was placed behind the fascia transversalis, 2 developed hematoma at the incision site and 1 developed orchitis. There was no significant difference in the complication rate between the two hernia repair methods ($P>0.05$), and all complications were successfully treated. During a mean follow-up period of 44 months (range 12–72 months), none of the patients had hernia recurrence.

Discussion

The goal of surgical treatment of inguinal hernias is to reduce the rate of recurrence. One of the most important factors associated with recurrence is anatomic structures in the region that remain under tension. Tension does not occur in hernias repaired using mesh.

The Prolene mesh used to repair inguinal hernias in the present study is made of a monofilament polypropylene that does not shrivel in the body due to its double-knotted structure. Moreover, it does not unravel when cut to fit a particular shape. It increases the strength of the inguinal base, as a very strong fibrosis reaction occurs along and around the mesh once it is placed in the body. In adults with an indirect hernia, the use of a mesh prevents formation of a direct hernia later in life [11].

Mesh does have some limitations as follows:

1. Mesh is a foreign material and as such may be rejected by the immune system; however, in 1,000 cases in which mesh was used on the abdominal wall no rejections were reported [5].

2. Mesh is associated with the risk of infection, but infection is rarely reported [5–8].

The only problem that can be attributed to the repair of an inguinal hernia with mesh is compression of the ilioinguinal or iliohypogastric nerves between the sutures of the mesh, which can result in postoperative pain; however, this complication can be prevented with careful suturing [12]. In the present study, rejection, infection, and long-term postoperative pain were not observed.

The hernia recurrence rate is 1.4–22 % when repair is made without the use of mesh [1–4], whereas when mesh is used the rate is <1 % [5–8]. During a mean follow-up period of 44 months (range 12–72 months), none of the patients in the present study had hernia recurrence. Complications of hernia repair with mesh include cellulite at the incision site, hematoma, seroma, and temporary nerve irritation [5–8, 13]. In the present study, only 8 (7.5 %) of 106 patients that underwent inguinal hernia repair with mesh via the anterior approach developed postoperative complications, including hematoma at the site of the incision ($n=4$), seroma ($n=2$), scrotal edema ($n=1$), and orchitis ($n=1$). The difference in the complication rate between the two hernia repair methods (mesh placed in front of or behind the fascia transversalis) was not significant. In conclusion, there was not a significant difference in the short- and long-term outcomes between the patients who underwent the two hernia repair methods.

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