Is Repair of Incisional Hernias by Polypropylene Mesh a Safe Procedure?

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Key Words

Intraperitoneal polypropylene mesh • Incisional hernia

Abstract

Objective: The aim of our study was to evaluate the safety of the intraperitoneal mesh repair procedure and to assess the complications that develop after the procedure. **Subjects and Methods:** We reviewed the records of 25 patients who underwent intraperitoneal mesh repair procedures. Data on age, sex, size and cause of the hernia, postoperative mortality, and morbidity with special attention to complications were obtained from the medical records. **Results:** Of the 25 patients (7 males, 18 females), the original operation was cholecystectomy in 15 cases (60%), gynaecological surgery in 2, gastric surgery in 2, and umbilical hernia in 2. Incisions were midline in 20 cases (80%), transverse in 2 and laparoscopic port sites in 3 patients. The average size of the hernia was 150 cm². Local complications occurred in 4 (16%) patients. Postoperative complications included wound infection in 3 patients and haematoma in 1 patient. Postoperative hospital stay ranged from 3 to 25 days with a mean of 6 days. No recurrence developed during 28-month follow-up. **Conclusion:** The tension-free repair of incisional hernia with polypropylene mesh in intraperitoneal position is a safe and easy procedure with acceptable morbidity and no recurrence.

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Introduction

The formation of incisional hernias continues to be a worldwide problem, mainly in classical open surgery. Previously, such hernias were treated with primary closure. After reports of high recurrence rates, ranging from 30 to 50% with primary closure, tension-free repair has been performed with polypropylene (PP) meshes [1–3].

Animal experiments and clinical studies showed that PP meshes were effective devices that allowed low infection rates for the repair of abdominal wall defects. PP meshes also offered long-term stability, but had a tendency to induce certain complications such as seroma, mechanical bowel obstruction, and enterocutaneous fistulae. In the literature, adhesions of viscera and enterocutaneous fistulas were reported after intraperitoneal hernia repair with PP mesh [4]. Surgeons have tried to decrease these complications by using omentum, bioabsorbable mesh and expanded polytetrafluorethylene (ePTFE) mesh for inlay and intraperitoneal mesh placement [5]. Incidentally, restrictions associated with the use of ePTFE mesh have arisen, especially in second-level hospitals in developing countries, because of its high cost and limited availability [5].

The aim of our study was to evaluate, retrospectively, the safety of the intraperitoneal PP mesh repair procedure, based on early and late results of patients with intraperitoneally inserted mesh, and to describe the experience of repairing hernia using intraperitoneal PP mesh.

Fig. 1. Intraoperative appearance of contact between the PP mesh and the bowels.

Subjects and Methods

We reviewed the medical records of 25 patients who had undergone incisional hernia repair using intraperitoneal PP mesh between April 2004 and July 2005. In each patient, hernia repair was performed as an elective operation. Besides hernia repair, our records showed that an additional surgical procedure had been performed for iatrogenic bowel perforation in 1 patient. We examined patient age, sex, presence of associated medical diseases, abdominal surgical history, location of the hernia, intraoperative size of the hernia, postoperative mortality and morbidity. We recorded whether the hernia was primary or recurrent, and also the position of the incision.

General anaesthesia was routinely used in all cases. Patients received a single dose of antibiotic at induction. Antibiotic was given as a prophylactic measure up to the 7th postoperative day in a patient with iatrogenic bowel (ileum) perforation.

During the operation, after preparation, the hernial sac was dissected and opened, and intestinal adhesions were dissected from the sac. Intestinal adhesions were removed (about 3 cm in all directions) to facilitate the placement of the mesh. A PP mesh (Prolene™), tailored to fit the defect so that at least 2 cm of the mesh overlapped the abdominal defect, was sutured to underlying fascial structures in an intraperitoneal position with interrupted PP 1/0 suture spaced not more than 1–2 cm apart.

In all cases, the omentum was insufficient to minimize contact between the mesh and the underlying organs. At laparotomy, peritoneal defects were left untreated (fig. 1). In 1 patient the mesh was fixed under contaminated conditions.

Patients were discharged when they were fully mobile, and there were no complications. Follow-up in our department was initially at 6 weeks and then 6-monthly, depending on clinical conditions. All patients were examined by specialist surgeons for 28 months after surgery. Complete clinical examination was done and the presence of hernia recurrence was noted. The examination included palpation while the patient was in the supine position.

Table 1. Previous operations and incisions of patients

	Patients
Midline superior incision	
Cholecystectomy	12 (48%)
Cholecystectomy + hydatid cyst of the liver	1 (4%)
Cholecystectomy + umbilical hernia	1
Elective gynaecological procedures	1
Gastric surgery	2 (8%)
Midline inferior incision	
Cholecystectomy	1
Elective gynaecological procedures	1
Appendectomy	1
Transverse incision	
Umbilical hernia	2
Port site	
Laparoscopic cholecystectomy	3 (12%)

Results

Mean age of the 25 patients was 50 years (range 33–74); 18 (69%) were females and 7 (31%) males. Five of them had co-morbid conditions, 3 females had hypertension and 2 males had diabetes mellitus.

In 20 (80%) of the patients, there was a previous history of laparotomy through midline incision for cholecystectomy, gastrectomy and genital tract disease. A high incidence of incisional hernia was found after midline superior and inferior incisions in 17 (68%) and 3 (12%) patients, respectively. Data on the type of previous operations and incisions are given in table 1. Two patients had undergone previous surgical procedures for incisional hernia recurrence (port site hernia and cholecystectomy with midline superior incision).

The average size of the hernias was 150 cm² (15 × 10 cm) and the largest fascial defect was 300 cm² (20 × 15 cm). The fascial defects at operation were classified as medium (5–10 cm; n = 12, 48%) and large (>10 cm; n = 13, 52%).

Major perioperative bleeding did not occur in any patient. It was not possible to place the omentum under the mesh in every patient. Hernias were repaired by intraperitoneal technique. One patient who had iatrogenic injury of the ileum was repaired using primary closure.

Mean surgical time was 90 min (range 75–110). Postoperative analgesia requirements were related to hernial size. In 43% of procedures, a suctioning drain was left in

place. The drains were removed after a median of 2 (range 1–4) days.

Local complications occurred in 4 (16%) patients and included superficial incisional surgical site infections in 2 patients, deep surgical site infection in 1 patient, and wound haematoma in another patient. Of the 3 patients that suffered incisional surgical site infections, 2 did not have further surgery to drain infection but were treated with antibiotics. The remaining patient received antibiotics for his deep incisional surgical site infection but did not require removal of the mesh and recovered without recurrence. Postoperative in-hospital stay ranged from 3 to 25 days with a mean of 6 days. All 25 patients were available for follow-up examinations, which continued for an average of 28 months (range 22–30). None of the patients were found to have had a recurrence.

Discussion

The use of a PP mesh to repair incisional hernias is well established [6]. In our study, most patients were in their forties, with a mean age of 50 years, similar to a previous study of patients in the same age group [2], with females outnumbering male patients [7].

The risk of incisional hernia development may be influenced by local or systemic factors. A study [2] reported that infection in a midline incision is the primary risk factor in the development of incisional hernias. The risk may be increased by concomitant medical conditions including obesity, hypertension, diabetes, pulmonary disease or by steroid use [2]. In our study, 5 patients (21%) had a previous history of hypertension and diabetes.

In 81% of our patients, the incisional hernia was present in the longitudinal incision of a previous operation. In other studies [2, 3, 8], incisional hernias were seen in midline incisions followed by transverse incisions.

Fascial defect size is a major issue because the greater the size of the hernia, the greater the risk of recurrence. Incisional hernias larger than 10 cm have significantly higher recurrence rates than small hernias [9]. In our case series, the average size of hernias was large (10 × 15 cm). The 2- to 3-cm mesh margin we used confirmed the previous reports [1, 6] that incisional hernias were significantly lower when non-absorbable sutures were employed.

The open suture repair with simple suturing of fascial edges is dubious due to recurrence seen in 31–60% of cases [1]. Long-term studies show the necessity of using a

mesh in all defects above 4 cm in diameter [10–13]. In the case series at our hospital, we used PP mesh characterized by elasticity, low price and preservation. However, clinical experience has shown that high rates of complication are related not only to the natural properties of PP, but also to the relation of the mesh to the hernial sac. So, which technique should be used for open mesh repair has not been defined by cumulative trials because patients are not referred to specialist hernia services.

Of the four repair techniques (onlay, inlay, sublay and intraperitoneal) [14–18], we used the intraperitoneal method, which did not confirm previous reports [19–21] that indicated a high incidence of visceral adhesions, fistulas, chronic pain and infertility in females after intraperitoneal PP mesh placement. Pain usually disappeared after 3–4 days postoperatively. Complications (noted mostly in small case series or case reports) [8, 22–25] were mainly attributed to extensive dissection of the surgical field. They could have been avoided by the interposition of the greater omentum, absorbable mesh or Seprafilm placed in between the PP mesh and the intestinal loop.

The previously accepted surgical dogma concerning the avoidance of intraperitoneal placement of PP mesh is currently being re-evaluated. In recent studies, the intraperitoneal technique seems to be the better method, enabling a low rate of postoperative wound complications and shorter operative time [14].

The use of ePTFE materials considerably decreases the recurrence of hernia and of adhesions [26–28]. Despite the numerous advantages of ePTFE mesh repair, it is still liable to mesh contraction and is very expensive when compared to PP mesh repair [29].

Local complications such as haematoma, seroma, and bowel obstruction have been reported in 20% of patients [1], but bowel obstruction did not occur in our study, although infection and haematoma were found in 4 (16%) patients. Wound infection is a potentially major complication that is usually superficial but can be severe enough to necessitate removal of the mesh. The 12% wound infection in our study was similar to that reported previously [13].

A report [30] described enterocutaneous fistula formation after the use of intraperitoneal mesh, but we did not observe such enterocutaneous fistula formation similar to another study [31].

One of the primary goals in hernia surgery is to provide a secure repair with a low long-term recurrence rate. A previous study [32] showed that 70–75% of incisional hernias developed within 24 months and that 80–

90% developed within 3 years. Incisional hernia repair with PP mesh is superior to primary closure in preventing hernia recurrence as evidenced in our study where no recurrences occurred during the 28-month follow-up.

Conclusion

Our data showed that tension-free repair of incisional hernia (with PP mesh in intraperitoneal position) is a safe and easy procedure with acceptable morbidity and no recurrence. Despite the small number of patients in our study, we further conclude that PP mesh may be applied in the absence of bioabsorbable mesh because of the low complication rates we experienced.

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