Laparoscopic Intraperitoneal Repair of Postoperative Ventral Incisional Hernia Using Composix™ Mesh

YASUMI ARAKI, NOBUYA ISHIBASHI, MASAMITU KANAZAWA, YUKIYA KISHIMOTO, KEIKO MATONO, TERUO SASATOMI, YUTAKA OGATA AND KAZUO SHIROZU

Department of Surgery, Kurume University School of Medicine, Kurume 830-0011, Japan

Summary: This report describes the technique and early results obtained with a simple laparoscopic intraperitoneal onlay Composix™ mesh repair for postoperative ventral hernia. Composix™ mesh is constructed from one layer of polypropylene mesh and another layer of expanded polytetrafluoroethylene (ePTFE). From March 2000 to October 2001, we performed laparoscopic repair of postoperative ventral hernia in 9 patients. Four (44%) of these patients had a history of at least one failed hernia repair. The size of the abdominal wall defect varied from 4×5 cm to 10×12 cm (median, 8×9 cm). In all cases, the Composix™ mesh (Bard Inc. USA) was stapled to the peritoneal surface of the abdominal wall, leaving the sac in situ. No death occurred as a result of surgery. Intraoperative small bowel injury occurred in one patient (11.1%) for whom surgery was converted to laparotomy and small bowel resection. No infection was observed. The length of hospital stay varied from 5 to 10 days (median, 5.6 days). During the follow-up period of 8 to 15 months (median, 2 months), there was no recurrence of hernia. Laparoscopic Composix™ mesh onlay repair is a safe, easy, and effective procedure with minimal discomfort and a low early recurrence rate.

Key words ventral hernia, laparoscopy, mesh

INTRODUCTION

Incisional ventral hernias will develop in 5 of 15% of patients who undergo laparotomy [1,2]. However, if the wound becomes infected postoperatively, the rate of recurrence may be more than 40% of infected patients [1]. The conventional repair of incisional ventral hernia is associated with a high incidence of complication and recurrence rate of up to 50% [3-5] in patients who have repairs without the use of a prosthetic patch. The use of a tension free mesh reduced the rate of recurrence to less than 10% [6,7], but not the high overall rate of wound complication [8-10]. Open repair also requires a large incision, wide dissection, and raising of flaps to dissect the hernia sac and exposure of the prosthesis to the possibility of contamination, which is an important factor predisposing to postoperative infection.

Laparoscopic repair of ventral hernia was first reported in 1992 [11], and has gained popularity because it combines the advantages of mesh reinforcement of the defect with the consequences of minimal access, which include decreased wound infection [12,13]. The benefits of minimally invasive surgery including decreased postoperative pain and reduced convalescence duration have been clearly demonstrated over the past several years with the advent of laparoscopic and thoracoscopic surgery. The aim of the present study was to determine whether laparoscopic repair of a postoperative ventral hernia was technically feasible, to determine the early results and complications of this operation, and to identify possible limitations of the procedure.

This paper describes a technique for tension-free,
PATIENTS AND METHODS

Between March 2000 and October 2001, 9 patients (7 females and 2 males) with a postoperative ventral hernia underwent laparoscopic repair. The median patient age was 56 years (range, 39-78 years). Four (44%) of these patients had a history of at least one failed hernia repair. The size of the abdominal wall defect varied from 4×5 cm to 10×12 cm (median, 8×9 cm).

Composix™ mesh (Bard Inc. USA) is constructed from one layer of polypropylene mesh and another layer of expanded polytetrafluoroethylene (ePTFE). The layers are stitched together with ePTFE monofilament. For maximum performance, the edge of the polypropylene mesh layer is heat-sealed to the ePTFE layer. In all cases, the Composix™ mesh was stapled to the peritoneal surface of the abdominal wall, leaving the sac in situ.

The procedure was performed under general anesthesia. The patient was given antibiotic prophylaxis, and the bladder was decompressed with a Foley catheter, and the stomach with a nasogastric tube. The patient was supine in the Trendelenburg position, and television monitors were positioned at the patient’s feet. An alternative port site was chosen away from the hernia defect and any abdominal incision. When an open technique was employed, the abdomen was insufflated with CO2 for visualization of the peritoneal cavity, and a 12-mm cannula was introduced to enter the abdominal cavity. A 25-degree laparoscope (Wolf Co. Germany) was introduced. The abdominal cavity was then explored and the hernia defect and adhesions were identified (Fig. 1). Two additional 12-mm and 5-mm trocars were inserted under direct vision as far lateral as possible (Fig. 2). The edge is then drawn on the abdominal wall and a 1-mm-thick mesh is measured to overlap the defect by at least 4 cm in all directions and cut to the appropriate size. After adhesiolysis, the fascial defect was defined and cleaned, and Composix™ mesh was trimmed to give at least a 4-cm circumferential margin over the defect. Direct vision and palpation allow identification of the edges of the hernia defect. The patch was introduced and spread out in the peritoneal cavity. Four to 6 sutures were

Fig. 1. Laparoscopic view of the adhesions into and around the hernia.

Fig. 2. Positions of trocars and intestinal retractor. 1: 25° laparoscope; 2: forceps, dissector; 3: scissors

Fig. 3. Double needles using the Funai suturing. Using transabdominal wall nonabsorbable sutures through points premarked on the skin to achieve correct positioning. Inversion of umbilicus A 4-0 Vicryl suture is passed through skin, hernia sac (peritoneum), and previously fixed mesh and tied extra corporeally.
placed through the abdominal wall using a double-straight needle device [14], and mesh was fixed in the anterior abdominal wall (Fig. 3). The gaps between the sutures are further secured circumferentially by stapling the patch to the abdominal wall using an articulating hernia stapler. Manually applied counter pressure on the outside of the abdominal wall is helpful at this point.

RESULTS

Clinical data were gathered prospectively. The operating surgeon performed the follow-up evaluation within 2 months after the procedure, and the median follow-up time was 12 months, and varied from 8 to 15 months.

Per oral fluids were started one day after the operation. The follow-up rate was 100% by examination. One case was converted to open repair because of small bowel injury (conversion rate 11.1%). Seromas appeared over the mesh in a sac, and was aspirated successfully. There was no infection, no adhesion-related bowel obstruction, and no persistent wound pain. The mean operating time was 85 min, with a range of 75 to 125 min. The mean hospital stay was 6 days (range, 4-7 days). No patient had a hernia recurrence after laparoscopic hernia repair. There were no operative complication and no requirement for blood transfusion. The diameter of the mesh varied from 9 × 10 cm to 14 × 16 cm (median, 12 × 13 cm) in 8 cases. There was no mortality among the patients in this study.

DISCUSSION

Incisional hernias, which are very complex and serious surgical problems, can be very difficult to repair and are associated with high rate of complication and recurrence. Laparoscopic ventral hernia repair is a new technique that can be used with reported advantages, to treat both spontaneous and incisional abdominal wall hernias of average size. The advantages include decreased postoperative pain, short hospitalization, early return to normal activities, and superior cosmetic results. Because ePTFE has minimal tendency to adhesion when in contact with tissue, it is the prosthesis selected by most authors [12,15,16]. Intraperitoneal use of the ePTFE prosthesis is safe [17], and does not result in serious complication as have been reported with the use of Marlex mesh, such as bowel obstruction, bowel fistula- lization, and mesh migration [18,19]. For these reasons, the use of Marlex mesh for intraperitoneal repair of incisional hernia is not justified [13,20].

Composix™ mesh offers the unique advantage of two functionally distinct biomaterial surfaces. One side of the material is polyester, which has a reasonable degree of rigidity and shape memory, together with relative transparency that allows easy use in laparoscopy. We relied on this first layer for firm binding to the abdominal wall. The other side of the ePTFE sheet separated the first biomaterial from the underlying bowel, with the aim of preventing adhesions and their related complications. Although the ePTFE is expensive, the ultimate benefit to the patient, the saving in hospitalization time, and the rapid return to normal activities are sufficient to make the procedure cost effective. Comparative studies show a lower incidence of postoperative complications with the laparoscopic technique than with the open procedure [11,12].

The high prosthesis infection rate reported with open mesh repairs [5,6,21], to which the mesh seems to be a major contributor [22], was not observed with this laparoscopic approach. Laparoscopic ventral hernia repair permits emplacement of mesh from a distant incision, which may be the reason for the absence of mesh infections in this series. Future refinement of the technique, progress in the technology of prosthetic biomaterials and the methods of their fixation are anticipated. Consequently, it is expected to become the technique of first choice for ventral hernia repair. Because the prosthesis is fixed during abdominal insufflations, tension on it is minimized. Hence, reduced postoperative pain and a lower incidence of recurrence are expected.

It is clear even from this limited and early experience that the laparoscopic technique offers good results with minor discomfort in a very cost-effective manner. It is technically simple, with no significant learning process needed. However, our report provides no long-term results. A much longer follow-up period with greater numbers of such repairs is required to determine the true value of this technique and its materials.

The primary goal of our laparoscopic mesh onlay repair was to perform the procedure quickly and easily on an outpatient basis, while retaining the low recurrence rate observed with open tension-free mesh techniques. Our early observations suggest that the laparoscopic use of Composix™ Mesh is safe and effective, with low recurrence and infection rates and a high outpatient rate.
REFERENCES


170 ARAKI ET AL.