Laparoscopic Hernia Repair: a Two-Port Technique

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ABSTRACT

Objective: Various ventral and incisional hernia repair techniques exist and have largely replaced the open ones. The purpose of this study was to document the 2-port technique and demonstrate that it is feasible, efficient, and safe. To our knowledge, this is the largest report on this topic to date in the English-language literature.

Methods: Forty patients with ventral hernias (VH) or incisional hernias (IH) underwent laparoscopic repair with a 2-port technique. The technique involves insertion of one 10-mm to 12-mm balloon port and one 5-mm port, usually on the left side as laterally as possible. A mesh is inserted through the balloon port site and secured to the abdominal wall by using either 4 peripheral or 1 central Prolene suture. Helical fasteners are used to attach the mesh to the abdominal wall.

Results: Forty patients with 47 hernias underwent repair. Operating time ranged from 15 minutes to 70 minutes. Early complications were seen in 5 patients and included 1 small bowel enterotomy, 2 small bowel obstructions (SBO) with bowel adhering to the visceral side of the mesh, 1 wound infection, and 1 seroma. Late postoperative complications occurred in 8 patients (20%) who experienced persistent abdominal pain that resolved without any treatment. There was one recurrence during a mean follow-up of 23.5 months.

Conclusion: Laparoscopic herniorrhaphy with the 2-port technique offers an efficient, safe, and effective repair for ventral and incisional hernias.

Key Words: Laparoscopy, Ventral hernia, Two-port technique.

INTRODUCTION

Since 1992, the laparoscopic technique has been applied to the repair of ventral hernias, because of its many advantages including the absence of large subcutaneous flaps, lower incidence of wound infection, and a reduction in postoperative pain and hospital stay.1 Numerous studies using the laparoscopic approach have reported a recurrence rate of 10%.2–4 Despite the fact that laparoscopic repair of ventral and incisional hernias is popular among general surgeons and gradually has replaced the open approach, there has been limited progress in the technique used over the past decade with most laparoscopic surgeons using at least 3 ports. To our knowledge, this is the third report in the English-language literature of the 2-port technique and includes the largest group of patients studied.

METHODS

Between January 2005 and March 2007, 45 consecutive patients underwent attempted laparoscopic ventral or incisional hernia repair using a 2-port technique and were studied prospectively. Exclusion criteria were very large hernias and patients with multiple abdominal operations (more than 2, one with midline incision). This series represents the initial experience with this technique for a single consultant surgeon. All 45 patients underwent laparoscopic repair with the 2-port method. Those with tenacious adhesions where dissection was not feasible with 2 ports were excluded from our study. As a result, 5 patients were excluded. Four (8.8%) required conversion to an open procedure: 3 due to tenacious adhesions and 1 due to laceration of the colon during adhesiolysis. In the fifth patient, a third port was required because it was very difficult to dissect the content of the hernia sac with only 2 ports. The remaining 40 patients (with 47 hernias) underwent laparoscopic repair successfully with the 2-port technique. Twenty-two patients were female and 18 were male. Mean age was 55.7 years (range, 38 to 78). All operations were performed by a single laparoscopic surgeon.
Operative Technique
Access to the abdomen and creation of pneumoperitoneum is obtained by placing a Veress needle in the left upper quadrant. One 10-mm to 12-mm balloon port and one 5-mm straight port are placed opposite the hernia as laterally as possible, preferably on the left side. The surgeon’s nondominant hand compresses the abdominal wall to bring it down to the scissors’ tip or Harmonic scalpel for dissection or adhesiolysis. The hernia sac content is then reduced, and the margins of the hernia defect cleared circumferentially to a distance of at least 4 cm. The mesh is fashioned extracorporeally to cover the defect with at least a 3-cm overlay margin circumferentially. The parietal surface of the mesh is stitched with one central Prolene suture for smaller mesh (mesh < 65 cm²) and 4 peripheral sutures (north, south, east, west) for larger mesh (mesh > 65 cm²). Composite polypropylene and ePTFE meshes are inserted through the balloon port or through the balloon port site and anchored to the abdominal wall with the full thickness Prolene sutures by using a suture passer. Helical fasteners are used to attach the periphery of the mesh to the abdominal wall at intervals of 1 cm. A second row of staples is placed at the inner periphery of the hernia defect. Once the edge of the mesh is anchored, the sutures are removed.

RESULTS
Of the 40 patients who underwent a 2-port repair, 33 had a single hernia (32 requiring 1 mesh and 1 requiring 2 meshes), 7 patients had double hernias, (3 requiring 1 mesh and 4 requiring 2 meshes). Thirty (63.8%) hernias were ventral (15 paraumbilical, 14 epigastric, 1 spigelian) and 15 (31.9%) were incisional. Two (4.3%) hernias involved divarication of recti muscles. The mean defect size was 60 cm² (range, 1 cm² to 504 cm²). The average mesh size was 231 cm² (range, 18.5 cm² to 548 cm²). The operative time ranged from 15 minutes to 70 minutes (mean, 34 minutes). The average hospital stay was 1.8 days (range, 0 to 10 days). Follow-up surveillance for complications and recurrence of the hernia was performed in an outpatient clinic at 6 weeks and by telephone interview at between 18 months and 44 months postoperatively. Mean follow-up length was 23.5 months. Eight patients were lost to the 18-month and 44-month postoperative follow-up because they could not be contacted for telephone interview using the contact details available. No early complications (<4 weeks postoperative) were observed in 35 of the 40 patients. Of the remaining 5 patients, one (2.5%) experienced an unrecognized intraoperative complication of small bowel (ileum) injury and subsequently developed peritonitis. She was discharged the same day after her operation but was readmitted the next day and underwent laparotomy and small bowel repair. Postoperatively, she was admitted to the intensive care unit. Her recovery was slow but uncomplicated. Four (10%) patients suffered early postoperative complications. Two (5%) developed small bowel obstruction with bowel adhering to the visceral side of the mesh; both were successfully treated laparoscopically.

One patient (2.5%) developed a seroma that needed aspiration. One (2.5%) developed a wound infection and was treated successfully with antibiotics. Late postoperative complications (>4 weeks) occurred in 8 patients (20%) who experienced persistent (>4 weeks) abdominal pain that resolved without any treatment. Only 1 (2.5%) patient developed recurrence during the follow-up period.

DISCUSSION
Several studies have compared laparoscopic versus open incisional/ventral hernia repair and reported that recurrences, complications, hospitalization length and cost were all lower in the laparoscopic group.5–7 Despite laparoscopic herniorrhaphy being shown to be safe and effective, its progress remains slow-paced.8 It is difficult to unroll mesh flat inside the peritoneal cavity laparoscopically, as well as to lift it and cover and fix the hernial defect, because of its soft nature and the location of the hernia defect at the top of the abdomen. It has been recognized that a secure, effective method is a combination of nonabsorbable sutures and endo-staplers or endo-staplers only, as this carries out the anchoring of the soft mesh in the laparoscopic incisional herniorrhaphy.8,9,10 In this study to overcome the difficulty of handling the mesh intraperitoneally, the surgeon initially oriented the mesh with either 1 suture centrally or 4 sutures (especially for bigger hernias) at the periphery and used full-thickness fixation of the mesh to position and anchor it correctly. This study shows that the 2-port technique is quick, as the mean operative time was 34 minutes and is comparable to the mean operative time (40 to 210 minutes) from other studies2,4,11–19 of at least 3 ports.

Contrary to the literature, the inclusion of even small paraumbilical hernias accounts for the higher number of primary hernias.

Intraoperative complications in this study were infrequent. One (2.5%) intraoperative complication from enterotomy occurred. The cause of the enterotomy is not clear,
but because the dissection was performed only with scissors and no electrocautery was used, we believe that it is Veress needle insertion-related. Despite the fact that the enterotomy rate is slightly higher than that reported in the literature, we deem that the number in our study is small and it might be misleading; therefore a larger number of patients are required to make safer comparisons.

Two patients developed small bowel obstruction with bowel adhering to the visceral side of the mesh. The bowel adhered both in the middle and in the periphery of the mesh. There is no clear explanation as to why this happened, because so far the mesh that we use for laparoscopic repair is not known to cause adhesions.

The percentage of patients who experienced persistent abdominal pain (20%) is higher than the 5.9% reported in another study but is very unlikely to be a complication from the technique itself. We strongly believe that the persistent pain is from the specific helical fasteners we used, and we now are replacing these with a different brand.

Only one patient developed recurrence 4 months postoperatively. This occurred at the periphery of the mesh despite the fact that the hernia defect was covered with at least a 3-cm overlay margin circumferentially; we think that there was some weakness at the abdominal wall that was not sufficiently covered by the mesh, leading to recurrence.

CONCLUSION

The 2-port technique is less invasive than techniques involving more than 2 ports and can be safely applied to almost all uncomplicated primary ventral hernias. The method is also applicable to incisional hernias as long as the content can be easily reduced with minimal dissection.

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