



Laparoscopic Ventral Hernia Repair: Our Experience in 75 Patients

¹Anshuman Pandey, ²Shakeel Masood, ³Smita Chauhan, ⁴Alankar K Gupta, ⁵Nitin Goel, ⁶Khalid Noman

ABSTRACT

Introduction and aim: Laparoscopic ventral hernia repair has become a method of choice for treatment of ventral hernias. It has benefits of shorter hospital stay, less pain, and better cosmetic results, although it continues to remain a challenging procedure, more so in reoperative abdomen and in patients with serious comorbidities. The aim of this study is to evaluate our experience of laparoscopic ventral hernia repair carried out by a single surgical team.

Materials and methods: Ventral hernia, both primary and incisional hernia, was repaired by laparoscopic intraperitoneal onlay mesh (IPOM) repair in 75 patients at a single center within 3 years between January 2013 and December 2016. This was done at a tertiary care center by a single operating team standardizing the procedure and evaluating the learning curve.

Results: Seventy-five patients underwent laparoscopic IPOM repair of which 45 were females and 30 males. The average age was 52 years (35–72) and size of defect ranged from 4 to 12 cm. Dual mesh with expanded polytetrafluoroethylene was used in all patients. Sixty-two cases were incisional hernias, 10 paraumbilical hernias, and 3 umbilical hernias. Of these, 14 were recurrent incisional hernias after open mesh hernioplasty out of which two cases recurred after laparoscopic IPOM. Mean operative time was 60 to 130 minutes. There were no conversions to open technique. The average hospital stay was 2 to 3 days. One patient had postoperative Richter's hernia which was managed by relaparoscopic reduction and transfascial closure of the defect. Three patients had postoperative ileus, three developed minor wound infection, and one patient had seroma. The average follow-up period was around 12 months.

Conclusion: Laparoscopic IPOM ventral hernia repair is a safe procedure in most cases with benefits of rapid recovery and better patient outcomes, more so in large recurrent incisional hernias and in patients with serious comorbidities.

Keywords: Incisional hernia, Intraperitoneal onlay mesh, Ventral hernia.

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¹Professor, ²Associate Professor, ³Assistant Professor, ⁴⁻⁶Senior Resident

¹⁻⁶Department of Surgical Gastroenterology, Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, Uttar Pradesh India

Corresponding Author: Alankar K Gupta, Senior Resident Department of Surgical Gastroenterology, Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, Uttar Pradesh India, Phone: +915222355897, e-mail: gupta.alankar@gmail.com

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INTRODUCTION

Laparoscopic intraperitoneal onlay mesh (IPOM) has become a method of choice for treatment of ventral and incisional hernias. It provides benefits of shorter hospital stay, less postoperative pain, and good cosmetic benefit. The procedure remains challenging as there is significant learning curve, more so in reoperative abdomen and malignancy. Additionally, it is expensive as the mesh used is costly along with its fixation devices. Laparoscopic incisional and ventral hernia repair was first reported in 1993.¹ It has since evolved with availability of better mesh and fixation devices along with improved laparoscopic vision. Laparoscopic IPOM surgery is not without problems. When the hernia is repaired by open technique without mesh, the chances of hernia recurrence is about 50%, whereas recurrence rate after mesh insertion is 20%. The recurrence rate is usually higher initially when surgeons are gaining experience and is related to learning curve.²

AIM

The aim of this study was to evaluate our experience of laparoscopic repair of various types of ventral hernias with IPOM and to study various aspects of this procedure, namely postoperative pain, period of hospital stay, rate of recovery, ease in placing a larger mesh, and overall outcome.

MATERIALS AND METHODS

A total of 75 patients with ventral hernia underwent laparoscopic IPOM repair between January 2013 and December 2016 in the Department of Surgical Gastroenterology at Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, India. Operations were done by a single surgical team who used a standardized procedure. It also afforded us an opportunity to evaluate the learning experience objectively. A total of 45 female and 30 male patients with a mean age of 52 (35–72) years underwent surgery. Sixty-two cases had incisional hernia, 10 cases paraumbilical, and 3 cases umbilical hernia. Of these, 14 patients had recurrent incisional hernia after



open mesh hernioplasty out of whom two cases were postlaparoscopic IPOM repair (Table 1). The mean body mass index (BMI) was 35 (25–45). Single hernia defect was found in 66 patients and multiple in 9 (14.1%) cases. The maximum diameter of defect ranges from 4 to 12 cm. We used 20 × 15 cm for small and 30 × 20 cm for large defects. All cases were repaired by dual mesh (Parietex, Covidien, Germany) and tackers were used to fix it after transfascial sutures (Absorbatack, Covidien, Germany). Most patients had comorbidities like diabetes mellitus, hypertension, obesity, and pulmonary disease. The learning curve was assessed on the following parameters: (a) Ease of placement and fixation of the large sized mesh; (b) time taken. The time was divided into time for initial dissection and time for the mesh placement and fixation.

Inclusion Criteria

Any patient with ventral hernia who was fit for general anesthesia.

Exclusion Criteria

Patients unfit for general anesthesia, presence of incarcerated bowel loops, evidence of vascular compromise on imaging and pregnancy.

Preoperative Preparation

All patients had documented detailed medical history. They underwent thorough physical examination with estimation of the hernia defect. All routine blood parameters including complete blood counts, renal and



Fig. 1: Port position with transilluminated hernia sac as seen externally

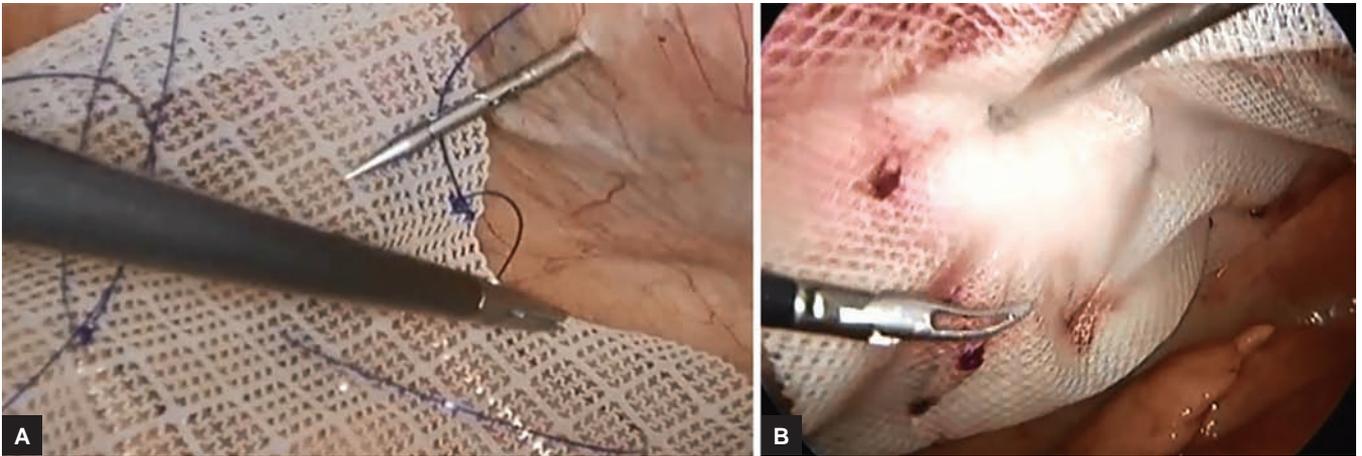
hepatic function tests, coagulation profile were evaluated. Patients with medical comorbidities like diabetes, hypertension, underlying malignancy, etc., were evaluated by respective specialists and optimized for surgery. Contrast-enhanced computed tomography abdomen was done in every patient to confirm the size of defect and its contents, and to look for other associated hernias that may have been missed on physical examination (Fig. 1).

Surgical Technique

The patient was placed supine with arm adducted. After induction of general anesthesia single dose of Injection Augmentin 1.2 gm intravenously was given as routine after sensitivity testing. Pneumoperitoneum was created with Veress needle which was introduced at a point away from hernia. Umbilicus or a point 2 cm below left costal margin in the midclavicular line (Palmer's point) was utilized for initial access.³ Ports were introduced in previously nonoperated area. In case the defect was in lower abdomen, the operative surgeon stood at head-end and when defect site was in upper abdomen, surgeon's position was in between the legs. Usually we used three ports. One was a 5 mm visual port for 30° telescope which was usually converted later to 12 mm port for the placement of large size of mesh. Another two 5 mm ports for working were utilized depending on site and size of ventral hernia (Fig. 2). Preoperatively, the margins of hernia defect were marked. Gentle reduction of contents and adhesiolysis was done with harmonic scalpel or electrocautery with a combination of blunt and sharp dissection. The margins and periphery of the defect were evaluated by direct vision and palpation after complete reduction of contents (Fig. 3). After complete reduction of herniating contents, the abdomen was deflated and the margins were reconfirmed. Suitable sized mesh was prepared by placing preplaced nonabsorbable sutures for

Table 1: Patient demography and hernia characteristics

Sex (male/female)	30/45
Age, mean (years)	52 (35–72)
<i>Type of hernia</i>	
Incisional: 62	
Midline	12
Right paramedian	0
Appendectomy	0
Right subcostal	0
<i>Paraumbilical hernia: 10</i>	
Primary with divarication recti	3
Recurrent	14
Postlap IPOM	3
Umbilical hernia: 3	2
Epigastric: 0	0
BMI, mean	35 (25–45)
Comorbidity	20
Defect size (cm)	4–12
Operating time (min)	60–130
Hospital stay (days)	2–3
Average follow-up (months)	12
Total no. of cases	75 (100%)



Figs 2A and B: Tranfascial preplaced suture fixation and tacker fixation of dual mesh

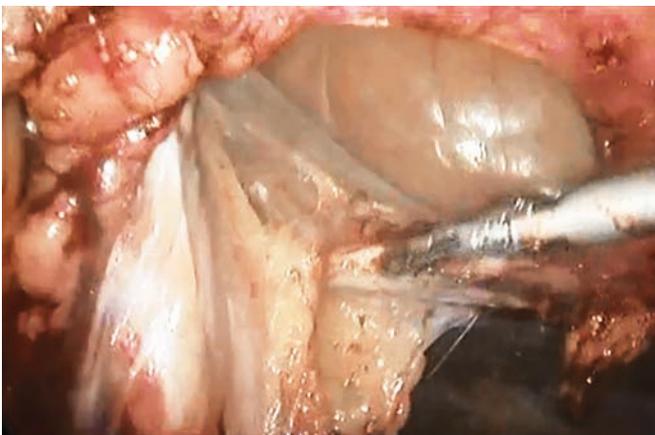


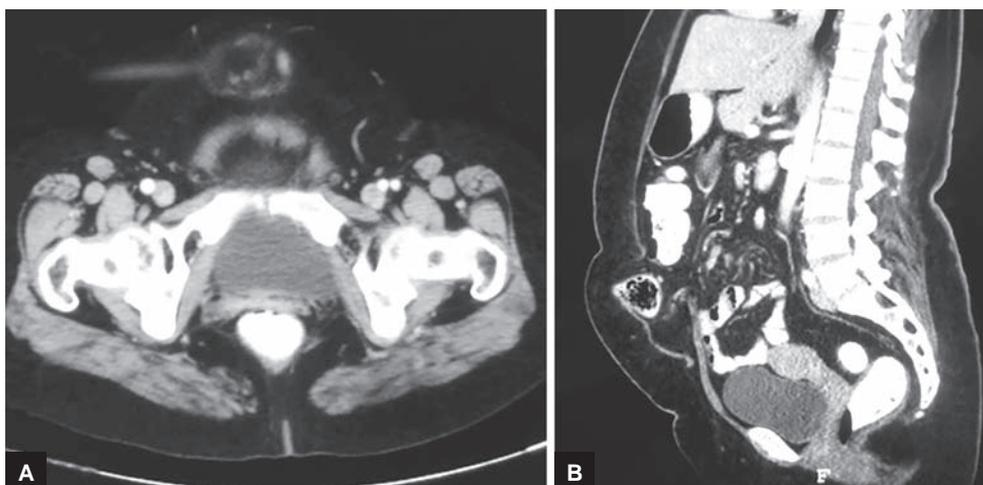
Fig. 3: Adhesiolysis from hernia sac

transfascial fixation. We routinely used one central and four peripheral sutures of Prolene or Nylon. The largest mesh was 30 × 20 cm in size and smallest 20 × 15 cm. In all patients, we used Parietex dual mesh (polyester with collagen-polyethylene glycol-glycerol coating, manufactured by Covidien, Germany). Prepared mesh was rolled and introduced into abdomen through 12 mm port. This was usually the optic port although any port could be

exchanged with 12 mm based on the surgeons' preference. The time was recorded starting from placement of mesh in the abdomen and its final fixation. Initially we used 10 mm scope to pass the rolled mesh but over a period of time 12 mm was found to be less cumbersome to introduce even the biggest mesh easily. The mesh was unrolled inside the abdomen, taking care of the orientation before fixation. Oxidized cellulose side was kept on visceral surface. The preplaced sutures at the periphery and center were pulled out using transfascial fixation needle (Aesculap, Germany) after very small skin incision. We usually pick the central fixation first as it helps in orientation of a larger sized mesh. These sutures are ligated subcutaneously and require no skin sutures. Mesh is then duly fixed with 5 mm absorbable tackers in two layers (Fig. 4).

RESULTS

In this study, intraoperative blood loss was not significant and there were no conversions to open method. Operative time ranged from 60 to 130 minutes which decreased with time. Mesh fixation after placement required



Figs 4A and B: Axial and sagittal image of infraumbilical incisional hernia

Table 2: Surgical complications

Complications	Number (%)
<i>Intraoperative complications</i>	
Bowel injury	0
Bleeding	0
Difficult dissection	30 (40%)
Conversion to open	0
<i>Postoperative complications</i>	
Hematoma	0
Seroma	2 (2.6%)
Wound infection	1 (1.3%)
Chest infection	1 (1.3%)
Early recurrence	0
Ileus	3 (4%)
Port site Richter's hernia	1 (1.3%)
Total cases	75 (100%)

around 30 minutes and variable time was required for adhesiolysis depending upon previous surgeries and adhesions. Umbilical and paraumbilical ventral hernia with minimal adhesions only required 60 minutes of operative time. There were no iatrogenic bowel injuries during procedure. One patient had feeding jejunostomy following a gastrojejunostomy for a benign gastric outlet obstruction. The Weitzel loop of bowel had to be brought down for placement of mesh, which was done successfully after incising a bit of parietal wall. Postoperative heaviness in abdomen and mild pain was the most common complaint. Postoperative ileus developed in three patients which resolved by conservative treatment. Minor wound infection occurred in three patients and one had a seroma (Table 2). One patient developed Richter's hernia through the 12 mm port. She was an obese lady with diabetes, hypertension, and had treatment for non-Hodgkin's lymphoma with multiple abdominal surgeries earlier with failed open mesh repair. This was diagnosed on day 4 and was managed by relaparoscopy and reduction of bowel loop. The defect was fixed transfascially under vision. This rare complication has been published.⁴ The postoperative hospital stay ranged 2 to 3 days. The average follow-up period was 12 months during which no recurrence was observed.

DISCUSSION

Ventral and incisional hernias are common long-term postoperative complications of abdominal surgery and have an incidence of 3 to 20%.⁵ It is more common in females. Early studies to describe laparoscopic repair of incisional hernia was published in 1993 by LeBlanc and Booth.¹ It offers early recovery, decreased hospital stay, minimal morbidity, and very low recurrence. It allows clear identification of multiple hernia defects which could be missed during open hernia repair.⁶ Mesh overlap should be 4 to

5 cm from the edge of defect. Minimal acceptable overlap is 3 cm if transfascial sutures are used.⁷ Adequate overlap promotes tension-free repair and proper closure of the defect. We used minimum mesh overlap of 4 to 5 cm on all sides. This is fixed with transfascial preplaced sutures and absorbable tackers in two layers. This allows proper mesh placement and reduces early folding or dislodgement of the mesh, which may be a cause of recurrence. In principle, laparoscopic repair of ventral hernia utilizes the same concept as open repair popularized by Stoppa,⁸ Rives and Pire,⁹ and Wantz.¹⁰ These include using large mesh prostheses, adequate overlap of hernia defect with tension-free repair. Operating time of laparoscopic ventral repair is longer than open ventral hernia repair, although some authors have reported no difference. Laparoscopic ventral hernia repair may be a challenging procedure with long-standing defects, incarcerated small bowel, morbid obesity, multiple previous repairs, and need for placement of prosthetic mesh but offers significant benefits of less postoperative pain, shorter hospital stay, early return to work, and placement of a large-sized mesh which have been confirmed in various studies. In this study, patients required analgesia on need basis up to 12 hours. Thereafter, only oral nonsteroidal anti-inflammatory drugs were used if needed. They all were mobilized early and tolerated the surgery well. Six patients had minor complications like wound infection, seroma, and ileus. Only one patient had significant problem as postoperative Richter's hernia through the 12 mm defect which was diagnosed and early redo laparoscopy with repair of defect was done successfully.⁴ Mesh shrinkage is greater in the tack group as compared with suture group when used individually. Recurrence of hernia following repair is a problem and is reported variably with the usage of different mesh fixation techniques¹¹⁻¹³ Carbajo et al¹² mentioned a recurrence rate of 4.4% during follow-up period of 44 months, although another study has reported a recurrence rate of 1% during mean follow-up of 27 months.¹³ In our study, there was no major morbidity and no operative mortality. Significantly, in our early experience, there were no major complications except Richter's hernia at port site in one case in immediate postoperative period. We used standardized protocol and similar technique in each case and documented the operative time after adhesiolysis and mesh fixation. Time taken for adhesiolysis was dependent on presence of adhesions of previous surgery or mesh placements. In case of simple umbilical hernias, the operative time was around 60 minutes for the entire procedure. The placement of large-sized prepared mesh was easier through 12 mm port as compared with 10 mm port and we shifted to 12 mm after initial four cases. The mesh handling was better and preserved the collagen layer from being torn,

etc. Parietex dual mesh (Covidien) was used in each case. In our scenario, the cost is important and laparoscopic ventral hernia repair is expensive using costly mesh and fixation device. But the procedure was more patient friendly, with less morbidity, shorter length of hospital stay, limited need of drains, less chance of infection, and overall similar operative time as compared with open surgery. More so, obese patients with medical comorbidities and recurrent hernias did quite well. There was no early recurrence in the average follow-up of 1 year. We routinely applied abdominal binder for 6 weeks following surgery. One patient had excision of redundant skin excision under local anesthesia after umbilical hernia repair. Therefore, laparoscopic repair may be termed as better than open repair.¹⁴ Pooled data analysis of 45 published series, representing 5,340 patients (4,582 laparoscopic, 758 open), demonstrates a significantly lower recurrence rate with laparoscopic ventral hernia repair compared with open ventral hernia repair series.¹⁵ Although recurrence still remains an important problem after laparoscopic ventral hernia repair, it does not exceed 5 to 10% in most of the published reports.^{16,17}

CONCLUSION

In this study, our early experience in 75 patients was that the laparoscopic ventral hernia (laparoscopic IPOM) repair is a safe procedure in most cases with benefits of rapid recovery, less pain, reduced hospital stay, and fewer complications, even in patients with medical comorbidities, and with very low early recurrence.

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