

Original Article

Outcomes of Laparoscopic Intra-Peritoneal Onlay Mesh with fascial repair (IPOM +) Using Composite Mesh for the Treatment of Ventral Hernias

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**ABSTRACT**

Background: Ventral hernias are a common occurrence, incisional hernias being the most common, developing in up to 20% of laparotomy incisions. Numerous studies indicate that laparoscopic approach is safe and effective, and may be superior to open repair with regard to lower rates of recurrence, wound infection, greater patient acceptance, shorter hospital stay and early return to work.

Objective: This study is designed to analyze outcome, complications, postoperative pain & patient compliance in laparoscopic ventral hernia repair by laparoscopic intraperitoneal onlay mesh with fascial repair (ipom plus) technique, using composite mesh. **Materials and Methods:** This was a prospective study of patients diagnosed to have ventral hernia admitted to Border Guard Hospital Dhaka for elective laparoscopic ventral hernia repair by ipom plus technique between January 2018 to December 2020. Post-operatively patients were evaluated

for outcomes in sense of effectiveness, pain and complications. **Results:** Of the 30 patients, 17(56.7%) incisional hernias, 6(20%) paraumbilical hernias, 5(16.7%) umbilical hernia & 2(6.7%) had epigastric hernia. The mean age of the patients were 40 years. Female to male ratio was 1.5 : 1. Average defect size was 4.2 cm. Mean operative time was 59.6 min. Mean post-op hospital stay was 5.16 days. Average duration for post-operative pain was 5.2 days. Intensity of pain by VAS pain score was 4 ± 0.49 , $2.7 \pm .65$, 0.82 ± 0.8 after 24 hours, 1 week and 4 weeks respectively. No conversion to open laparotomy was required. Reported complications were post-operative ileus 1(3.3%), seroma 2(6.7%), surgical site infection 2(6.7%) over one year of follow up. **Conclusion:** Laparoscopic ventral hernia repair with IPOM plus technique using composite mesh has good & efficient outcomes in terms of effectiveness and postoperative complications with satisfactory patient compliance.

Keywords: Ventral hernia, IPOM Plus

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INTRODUCTION

Ventral abdominal wall hernia surgery is a common procedure in the armamentarium of surgeons. Incisional hernias after previous abdominal surgeries occur in a varying range, reported from 11% to 20%.^{1,2} Laparoscopic repair of such hernias has an advantage of shorter hospital stay, lower wound infection, earlier recovery and recurrence rates less than 5%.³⁻⁷ Since its first description in 1993, laparoscopic repair of ventral hernias is gaining acceptance and becoming more popular by the day worldwide. However, the standard laparoscopic repair of ventral hernias consisted of bridging the defect from the peritoneal side with a composite mesh, known as the intra-peritoneal onlay mesh (IPOM) repair, which is placement of the mesh in the underlay position through the laparoscopic intraperitoneal approach. Such repair is associated with a significant incidence of post-operative bulging or eventration of mesh, seromas, recurrences and non-restoration of abdominal muscle function.⁸⁻¹⁰ To circumvent these problems, sutured closure of the defect in the fascia with intra-peritoneal mesh reinforcement has been described, termed the IPOM plus repair.¹¹ This repair is now the recommended procedure in the guideline of International Endohernia Society

MATERIALS AND METHODS

This was a prospective observational study conducted in Border Guard Hospital Dhaka for elective laparoscopic ventral hernia repair by IPOM plus technique between January 2018 to December 2020. Total 30 patients posted for laparoscopic repair of abdominal ventral hernia were included in the study. Patients unfit for general anesthesia, patients posted for open repair or a hybrid approach were excluded. This approach removed patients with incarcerated, obstructed or strangulated hernias from this study as

these patients were managed either by open repair or a hybrid approach. This also excluded patients with domain loss (width of the gap in fascia in resting supine position) of more than 8 cm as these patients were electively posted for open repair.

The width of the defect was measured as the maximum distance between the medial edges of the defect in the fascia when the patient is in a resting supine position confirmed by USG or CT scan of abdomen. The operating time was calculated from the insertion of the first trocar to exsufflation. The patient was placed supine with both upper limbs by the side. The monitor was at the foot end of the operation table. The surgeon stands near the head of the patient with the camera surgeon to his left. Ryle's tube is inserted to ensure a deflated stomach. Pneumoperitoneum is achieved by insufflating through a Veress needle inserted at Palmer's point. Three ports are inserted.



Figure: 1 Primary Port placement



Figure: 2 Contents of hernia were reduced

After adhesiolysis, the hernia sac is excised. The defect is closed intracorporeally with continuous sutures or extra corporeally by suture passer. The intra-peritoneal pressure may be reduced at this time to 8-10 mm of mercury to facilitate this step. Composite mesh (BIRD Composix L/P mesh) is introduced for intra-peritoneal placement of a size sufficient to ensure a minimum of 5 cm overlap of the edges of the defect. The mesh is first oriented with 5 transfascial sutures - 1 central and 4 peripherals, with the central sutures passed through the center of the defect to ensure proper alignment. Mesh was fixed by tackers or non absorbable suture. Hemostasis is ensured before desufflation.



Figure 3 Primary defect closed with non-absorbable suture (IPOM PLUS)

RESULTS

Totally, 30 patients were enrolled, with 18 (60%) females and 12 (40%) males at a mean age of 40 ± 9.86 years. Most patients (17, 56.7%) had incisional hernia, 6(20%) paraumbilical hernia, 5(16.7%) umbilical hernia, and 2 (6.7%) epigastric hernia. The mean defect size was 4.28 ± 1.25 cm. For the surgical technique, all patients underwent IPOM PLUS by composite mesh.

Table: 1 Demographic data (n=30)

| Variables | Data |
|-----------|-------------------|
| Age | 40 (± 9.86) |



Figure 4 Defect is covered by composite mesh, which is secured with tackers.

The Ryle's tube is removed before extubation of the patient. The patients are mobilized and liquids orally are allowed once they are fully awake and non-sedated, usually 3-4 h after the surgery. Patients are discharged once they are fully mobile and comfortable on oral analgesics. Patients are called for routine follow-up after 7 days, 1 month, 3 months, 6 months, 1 year. If patients do not physically attend their follow-up date, attempt is made to contact them telephonically. During follow-up visits, patients' complaints, if any, are noted and physical examination is done. Chronic pain was defined as pain persisting at operative site beyond 6 months for which the patient needs to consume analgesic for relief. Data were analyzed by SPSS (Statistical Package for Social Science) version 25.

| | |
|----------------------|---------------------|
| Sex(F:M) | 18/12(1.5:1) |
| BMI | 26.6 (± 5.7) |
| Defect(cm) | 4.28 (± 1.25) |
| Incisional hernia | 17 (56.7%) |
| Paraumbilical hernia | 6 (20%) |
| Umbilical hernia | 5 (16.7%) |
| Epigastric hernia | 2 (6.7%) |

Mean operative time was ~ 59.67 min. During the operation 2 (6.7%) patients had bleeding which was managed laparoscopically.

Table: 2 Intraoperative data (n=30)

| Features | Data |
|--------------------|-------------|
| Intraoperative | 2 (6.7%) |
| Conversion to open | 00 |
| Duration (Minutes) | 59.67 ± 6.9 |

Mean hospital stay ~5.16 days and analgesic were required ~5.2 days. Intensity of pain by VAS pain score was 4±0.49, 2.7± .65, 0.82± 0.8 after 24 hours, 1 week and 4 weeks respectively. Mean duration of follow up was 18.6 months.

Table: 3 Post-operative data (n=30)

| Features | Data | |
|----------------|-----------------|-----------|
| Pain (VAS) | 6 hours | 4.6± 0.86 |
| | 24 hours | 4±0.49 |
| | 1 week | 2.7± .65 |
| | 4 weeks | 0.82±0.8 |
| Analgesic | 5.2±.8 days | |
| SSI | 2(6.7%) | |
| Seroma | 2(6.7%) | |
| Ileus | 1(3.3%) | |
| Hospital stays | 5.1±.59days | |
| Follow up | 18.6±4.2 Months | |
| Recurrence | Nil | |

For immediate complications seroma, ileus and wound infection were most common, with 2 (6.7%), 1 (3.3%), and 2 (6.7%) cases respectively.

DISCUSSION

Ventral hernias are commonly seen in clinical practice. These hernias may lead to discomfort or can be a concern cosmetically. Symptoms like pain and the increasing size of the protruding hernia due to straining can be alarming to patients, along with impending risk of incarceration. Hence the need for surgical repair. This can be achieved either as an open or laparoscopic approach.

In present study, mean age of patients was 40 years which is less compared to other studies, in most mean age ranging in 50-55

years. Female patients were majority (60%) similar to most other studies. Average BMI for present study was 26.6 whereas Daniel W Birch et al.¹³ study had mean BMI of 32. Similar to our side, K Kannan et al.¹⁴ had incisional formed the majority of ventral hernia cases. Mean operative time ~ 59.7 min with other studies ranging from 90-130 min. Mean hospital stay for this study was 5.1 days while other studies it ranged between 1.5 – 3days. No intraoperative open conversion was observed in this study whereas other studies showed minimum of 1% conversion to open surgery. A common complication seen after a laparoscopic ventral hernia repair is postoperative pain which often originates not from the hernia itself, but from the surrounding tissues and the mesh fixation materials or the trans fascial sutures.¹⁵ The incidence of SSI was 6.7%. We reviewed the literature on IPOM-Plus in the PubMed database and identified the SSI rate was less than 3%^{15,16} Other studies of Itani and colleagues and Kurmann and colleagues matched our results regarding the incidence of SSI.^{15,17} This is usually transient and improves over time. In our study we do not report any chronic pain requiring prolonged medication or intervention.

Another common complication commonly associated with laparoscopic ventral hernia repair is the development of post-operative seroma. It usually resolves spontaneously with no intervention, though if it is chronic or symptomatic then aspiration or drainage can be attempted. The frequency of seroma reported in a study was 27.8%¹⁸ but in our series which is 6.7%, and we were able to manage them all conservatively. The incidence of seroma after an IPOM Plus procedure when compared to standard IPOM surgery is controversial as different studies have reported differently. Some have reported IPOM Plus procedure to have better seroma outcomes¹⁸, similar outcomes¹⁹ or worse outcomes²⁰ as compared to IPOM surgery.

Many types of mesh with different compositions have been developed over the years laparoscopically. There is polypropylene mesh, PTFE, composite mesh, PCO (polyester coated with anti-adhesive collagen layer) and biologic meshes among many others. Some even raise a peritoneal flap to place the polypropylene mesh in a different layer than the intraabdominal viscera's as high rates of adhesions and bowel resection is noted with intraperitoneal use of polypropylene only mesh and therefore this practice is becoming obsolete.²¹ We

CONCLUSION:

Laparoscopic Ventral Hernia repair with IPOM technique using composite mesh has effective outcomes. Major benefit of this technique is the site of placement of the mesh without extensive subcutaneous

have used composite mesh intraperitoneally in our study as opposed to polypropylene onlay mesh. Now there have been many advances for the development of lesser adhesive prosthetic materials for use in the intraperitoneal cavity and the use of composite mesh are encouraged as compared to the polypropylene onlay mesh in direct contact. Many techniques have been developed for the fixation of the mesh to the abdominal wall, ranging from non-absorbable or absorbable use of sutures, tacks or fibrin glue.^{22,23}

tissue dissection for preparing the area for mesh placement. This results in a smaller surgical wound, a shorter hospital stays, lower wound complications, reduced post-operative pain and early recovery.

CONFLICT OF INTEREST: No

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