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Research Article

Laparoscopic Ventral Hernia Repair: A Systematic Institutional Review

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Abstract

Introduction: Incisional hernia is the most common long term surgical complication after laparotomy. LVHR is performed regularly at many centers as the first choice for ventral hernia repair to reap the benefits of MIS.

Methods: All patients with ventral hernia were included in the study who agreed to undergo LVHR. Patients with incarcerated, obstructed or strangulated hernias were excluded. 26 patients were included who underwent IPOM repair over 24 months. Patient characteristics, demographics, perioperative and postoperative data was recorded and analyzed.

Results: Indications for LVHR were paraumbilical hernia in 15 (57.7%), epigastric hernia in 1 (3.8%), incisional hernia in 8 (30.8%) and umbilical port site hernia in 2 (7.7%) cases. The mean operative time for all laparoscopic ventral hernia repair was 82 (62-132) minutes. Nine patients developed some form of complications, 7 (26.9%) had developed a seroma and 2 (7.7%) had superficial surgical site infection and managed conservatively. There was no conversion to open procedure, no recurrences and no mortality.

Conclusion: Ventral hernias are frequent with an increase in the number of surgery happening now. The benefits of smaller surgical wounds, shorter hospital stay, fewer complications, lower post-operative pain and early recovery with IPOM has prompted many to use this technique of repair with good results.

Keywords: LVHR; IPOM Repair; Ventral Hernia; Incisional Hernia; Laparoscopic Ventral Hernia Repair; Intraperitoneal Onlay Mesh Repair

Introduction

Ventral hernia is a protrusion of an organ or tissue from the anterior abdominal wall either spontaneously - primary ventral hernia or from a previous surgical incision site - incisional hernia. Incisional hernia is the most common long term surgical complication after laparotomy with an incidence of between 9 and 20% after 1 year of operation [1]. Some have even reported up to 30% of patients undergoing laparotomy develop an incisional hernia [2]. Laparoscopic ventral hernia repair is catching on speed at many centers as the preferred method of ventral hernia repair to reap the benefits of minimal invasive hernia. Here we report our series of patients who have undergone laparoscopic ventral hernia repair and their outcome.

Methods

All patients attending the surgical outpatients department with ventral hernia- primary and incisional- were counseled for laparoscopic IPOM hernioplasty and those who agreed were included in this study. All patients with incarcerated, obstructed or strangulated hernias were excluded from this study. A total of 26 patients were included and they underwent IPOM hernioplasty, over a time period of 24 months (November 2017 till October 2019). All operations were performed by surgeons skilled in laparoscopic surgery with adequate exposure in treating with standard IPOM (sIPOM) and IPOM Plus. Preoperative evaluation was done by clinical assessment. An abdominal ultrasonography was done in selected cases where there was confusion about the hernia defect and diagnosis,

especially in obese patients. Patient characteristics, demographic data and perioperative data and postoperative data was analyzed and recorded. Collected data included symptoms, location and type of hernia, type of repair, operative time, and surgical complication in the form of vascular and visceral injury, surgical site infection, presence of seroma, length of hospital stay, recurrence and mortality. On follow-up all the pertinent data was recorded.

Procedure

Laparoscopic ventral hernia repair was performed using 3 abdominal trocars (one 10 mm and two 5 mm) on the left lateral abdominal wall. Pneumoperitoneum was achieved by open method at the left Palmer's point with carbon dioxide at 12-14 mm Hg. Two 5-mm trocars were positioned on either side of the telescope with adequate Azimuth angle. The hernia defect was visualized. Adhesiolysis was performed where necessary and the omentum and bowel were separated from the abdominal wall to expose all the hernial defect. The hernia sac was not dissected.

In cases of IPOM Plus, interrupted extracorporeal transfascial nonabsorbable Prolene 2-0 suture reinforcement for closure of the fascial defect was used at the hernia edges for approximation of the fascial defect with the suture knots lying in the subcutaneous plane.

The composite mesh was introduced into the abdominal cavity through the 10-mm trocar. The mesh was then placed over the defect with at least 5-cm overlap at all sides. Fixation of the mesh was achieved by nonabsorbable tackers. Hemostasis was achieved before removal of the trocars. The 10-mm trocar defect was closed using Polysorb 1-0.

Results

Twenty six patients underwent laparoscopic ventral hernia repair in the study period (Table 1). There were 12 (46.2%) males and females 14 (53.8%). The mean age of the patients was 47.4 (21-76) years. All patients complained of a swelling in the abdomen, while 9 (34.6%) patients also complained of pain and discomfort around the swelling. The mean operative time for all laparoscopic ventral hernia repair was 82 (62-132) minutes. While the average operative time for sIPOM repair was 74 (62-114) minutes and for IPOM Plus repair was 89 (69-132) minutes. Eleven (42.3%) patients underwent sIPOM while 15 (57.7%) patients underwent IPOM Plus. Indications for laparoscopic hernia repair was primary paraumbilical hernia in 15 (57.7%) cases, epigastric hernia in 1 (3.8%) case, incisional hernia in 8 (30.8%) cases and umbilical port site hernia in 2 (7.7%) cases. Of the 8 incisional hernias, 3 patients also had Swiss cheese hernia defects which was seen intraperitoneally. In addition to ventral hernia repair procedure, in the same sitting laparoscopic cholecystectomy was done in 1 case and right sided TAPP was done in 2 cases; while omental and bowel adhesiolysis was done in 12 cases.

In our series, 9 (34.6%) patients developed some form of complications. Of them, 7 (26.9%) had developed a seroma which was managed conservatively and they resolved over a 3 weeks period spontaneously. In 2 (7.7%) patients we had some degree of superficial surgical site infection, but were managed conservatively with topical antibiotics and dressing. There was no mesh infection or deep surgical site infection. No visceral or vascular injury was noted. None of the cases required conversion to open. The average length of stay in hospital was 2.5 (2-4) days. No patients complained of chronic pain either following the procedure or during the follow-up period. We had no conversion to open procedure for any of the patients. And on up to 12 months follow-up for the patients, no recurrences are noted. There was no mortality in this series.

Discussion

Ventral hernias are more commonly seen in clinical practice as a result of increasing surgical procedures that are being performed and the high incidence of incisional hernias as a complication following them along with the cosmetic awareness of primary ventral hernias. These ventral 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 open repair of ventral hernia a mesh can be placed using the onlay, sublay or inlay technique, the most common being the onlay technique where the mesh is placed between the subcutaneous tissue and the anterior rectus sheath. While in laparoscopic repair the mesh is placed intra-abdominally and secured to the peritoneum which is known as intraperitoneal onlay mesh or IPOM which was first described in 1993 and has slowly gained popularity over the years [3]. Also sutured closure of the defect in the fascia with intraperitoneal mesh reinforcement and is termed as IPOM Plus repair [4], which was introduced by Franklin et al. to reduce the hernia-related complications which includes recurrence, seroma formation, and mesh bulging [5]. This repair is now recommended by the International Endohernia Society guidelines for laparoscopic ventral hernia repair [6]. In IPOM Plus the closure of the fascial defect can be achieved by various means - interrupted or continuous, intracorporeal or extracorporeal sutures.

Characteristic	Total
N (26)	
Age (years)	47.4 (21-76) years
Mean	
Gender, n (%)	
Male	12 (46.2%)
Females	14 (53.8%)
Mean Operative time (minutes)	
All	82 (62-132)
sIPOM	74 (62-114)
IPOM Plus	89 (69-132)
Site, n (%)	
Paraumbilical hernia	15 (57.7%)
Epigastric hernia	1 (3.8%)
Incisional hernia	8 (30.8%)
Umbilical Port site hernia	2 (7.7%)
Type of repair, n (%)	
sIPOM	11 (42.3%)
IPOM Plus	15 (57.8%)
Primary	16 (61.5%)
Incisional	10 (38.5%)
Combined procedure, n (%)	
Laparoscopic cholecystectomy	1 (3.8%)
Right TAPP	2 (7.7%)
Left eversion of sac	1 (3.8%)
Combined procedure type, n (%)	
Pantaloon hernia	4 (8.5)
Umbilical hernia	2 (4.3)
Cholecystectomy	5 (10.6)
Surgical complications, n (%)	
Yes	9 (34.6%)
No	17 (65.4%)
Seroma formation	7 (26.9%)
Surgical site infection	2 (7.7%)
Mesh infection	0
Vascular injury	0
Visceral injury	0
Recurrence	0
Conversion	0
Length of hospital stay (days)	2.5 (2-4)
Mortality	0

Table 1: Characteristics and Baseline Operative Details.

The benefits of laparoscopic surgery in the form of lesser tissue trauma, decreased postoperative pain, lower postoperative and surgical site infection and a faster postoperative recovery allowing the individual to resume work faster along with a better cosmetic result has made it more appealing to the fast paced economic world. The obvious disadvantages being the need for general anaesthesia, comparatively longer operative time, increased cost and modern instrumentation with a learning curve for the surgeon and the operative team. Yet it has appealed to many surgeons to adapt and pursue it and has led to a number of research in this field with promising results.

Although advances have been made in the area of incisional hernia with the operating technique and prosthetic material use, recurrence rates as high as 32% with prosthesis repair and 63% with suture repair have been reported which sounds alarming [7]. In 2000, a randomized controlled trial reported that mesh repair is superior to suture repair, even for small incisional hernias [8], thus advocating the use of a mesh for all cases of ventral hernia repair. Yet in the Netherlands in 2002, surgeons did not use a mesh in 40% of incisional hernia repairs [9]. While in Germany 1997, 85% of incisional hernias repairs was still performed without a prosthetic mesh [10].

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 visceras as high rates of adhesions and bowel resection is noted with intraperitoneal use of polypropylene only mesh and therefore this practice is becoming obsolete [11]. We have used composite mesh intraperitoneally in our study as opposed to polypropylene only 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 only 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 [12,13]. Some advocate using transfascial non-absorbable sutures for greater tensile strength over others [14].

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 transfascial sutures [15]. This is usually transient and improves over time. In our study we do not report any chronic pain requiring prolonged medication or intervention.

Adequate adhesiolysis is also necessary for intraperitoneal mesh placement but also for detecting other small hernias which may be missed, also known as the "Swiss-cheese" defects. These can later present as hernia recurrence in the early post-operative period. We had 3 patients with Swiss-cheese defects in our patients with incisional hernia and were visualized adequately with proper adhesiolysis. It is also stated that it is important to use a suitable mesh that overlaps the hernia defect by at least four to five centimeters [16].

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%.[17] Which is also similar to that seen in our series which is 26.9%, and we were able to manage them all conservatively and by use to abdominal binders. 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 outcomes [17], similar outcomes [18] or worse outcomes [19] as compared to IPOM surgery. Also we cannot comment on this through our study.

In our study the average operating time was 82 (62-132) minutes and we only had small incisional hernias of less than 5 cms in our series. An article reports the time range for laparoscopic repair of small incisional hernia (<10 cms) was 109 (65-219) mins, while the reported operation time was 150 (90–301) mins for sIPOM and 148 (68–265) mins for IPOM-Plus. However this study also included large incisional hernias (>10 cms) in their group and the recurrence rate in sIPOM vs IPOM-Plus was 8 and 7% [20].

Also studies have shown that laparoscopic repair is superior to open repair in the short term outcomes with respect to lesser blood loss, fewer perioperative complications and shorter hospital stay [21,22]. In a review article, it was consistently seen that laparoscopic surgery resulted in reduced risk of wound infection and significant shorter hospital stay. However the risk of inadvertent enterotomy was slightly higher in laparoscopic hernia repair. It was also noted that laparoscopic surgery took significantly longer than open surgery in some trials and the other way around in some [23]. Also an improvement in the functional activity of abdominal muscles and an improved isokinetic strength of the trunk flexor muscles is described after an IPOM Plus repair with closure of the fascial defect [17,24].

One major benefit of laparoscopic repair over open repair is the site of placement of the mesh laparoscopically which means extensive subcutaneous tissue dissection is not required as with open repair for preparing the area for mesh placement. This results in a smaller surgical wound, a shorter hospital stay, lower wound complications, reduced post-operative pain and early recovery [25-27]. Another factor that plays a vital role is the cost incurred. Laparoscopic hernia repair being the costlier when compared to open surgery as it uses an expensive mesh, laparoscopic equipments and use of general anaesthesia, however the shorter hospital stay after laparoscopic procedure makes it cost-efficient [21].

Conclusion

A recent review also concludes that IPOM-Plus is more effective than sIPOM [28]. However more trials and systematic reviews are needed to confirm the risks and the benefits of laparoscopic hernia surgery for it to be standardized and accepted as gold standard.

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