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Open versus laparoscopic mesh repair of ventral Hernias: A prospective study

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Abstract

Ventral hernia refer to facial defects of the anterolateral abdominal wall through which intermittent or continuous protrusion of preperitoneal fat, intestinal contents, or rarely, an abdominal organ may occur, they are either congenital or acquired. It includes incisional hernias, paraumbilical hernias, umbilical hernia, epigastric hernias and spigelian hernias. Data was collected from Patients admitted with ventral hernia with the help of a proforma containing relevant history, clinical examination, appropriate investigations and surgical details.

The study was carried out with ethical clearance by the institutional ethics committee and in conformity with the guidelines for medical research laid out by ICMR and Helsinki declaration.

In our study we observed that the mean duration of surgery in open group was 75.8 +/- 30.7 min and in laparoscopic group was 77.3 +/- 22.4 min. Both the groups didn't differ with respect the duration of surgery. In our study we observed that mean duration of time taken to return to work (RTW) was 24.8 +/- 65 and 11.2 +/- 3.5 days in open and laparoscopic groups respectively. This observation was statistically significant with p value < 0.001.

Keywords: Laparoscopic mesh repair, ventral hernias, open mesh repair

Introduction

A hernia is a protrusion of visceral contents through the abdominal wall. There are two key components of a hernia. The first is the defect itself, namely the size and location of the defect. The second component is the hernia sac, which is protrusion of peritoneum through the defect. The hernia sac may contain abdominal contents such as omentum, small intestine, colon or bladder, or the sac may be empty [2].

Ventral hernia refer to facial defects of the anterolateral abdominal wall through which intermittent or continuous protrusion of preperitoneal fat, intestinal contents, or rarely, an abdominal organ may occur, they are either congenital or acquired [2]. It includes incisional hernias, paraumbilical hernias, umbilical hernia, epigastric hernias and spigelian hernias [2].

In adults, more than 80% of ventral hernias result from previous surgery hence the term incisional hernias. They have been reported to occur after 0–26% of abdominal procedure. Although these hernias mostly become clinically manifest between 2 years and 5 years after surgery, studies have shown that, the process starts within the first postoperative month [2].

Midline hernia occurring through linea alba abutting superiorly or inferiorly on the umbilicus is called as the para umbilical hernia [3]. They are generally acquired lesions. If the defect is small it can be repaired surgically. But large hernias with wide openings are difficult to repair surgically and should be treated with synthetic mesh repair. Epigastric hernia protrude through linea alba above the umbilicus [3, 4, 5]. Approximately 5% of the populations have epigastric hernias. Symptomatic epigastric hernia require surgery, incarceration of extraperitoneal fat is the pathology which is content of epigastric hernia. There is no sac, hence no bowel or omentum get stuck. Most of the spigelian hernias are acquired and requires surgery as the chances of intestinal obstruction is high [3, 4, 5].

There are various types of repairs proposed for ventral hernias, of which the mesh repair has become most popular and acceptable. In this modern era of surgery, most of the emphasis is made on decreasing the hospital stay of the patient and also decreasing the postoperative morbidity and importance is given to cosmesis.

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Hence Laparoscopic surgery has gained paramount importance due to its minimally invasive technique, decreased hospital stay and also better cosmesis. There is continued debate as to the role of laparoscopy in ventral hernia repair, although laparoscopic repair has become increasingly popular, its outcomes need further evaluation.

Methodology

Data was collected from Patients admitted with ventral hernia with the help of a proforma containing relevant history, clinical examination, appropriate investigations and surgical details.

The study was carried out with ethical clearance by the institutional ethics committee and in conformity with the guidelines for medical research laid out by ICMR and Helsinki declaration.

30 consecutive adult patients with age above 18 years who underwent laparoscopic and 30 consecutive adult patients with age above 18 years who underwent open mesh repair of ventral hernias in Department of Surgery were part of this study.

Preoperative Evaluation

All patients who participated in this study were evaluated pre operatively with detailed history, clinical examination and relevant investigations including biochemical, serological and imaging modalities (as necessary).

Preoperative Preparation

All patients underwent Preanaesthetic checkup and prior informed written consent was taken. Patients were kept NPO for 6 to 8 hours. Mechanical bowel preparation was given for few selected patients. A dose of prophylactic antibiotic was administered before induction of anesthesia according to the institutional protocol.

Selection of Type of Procedure

Patients were selected for the procedure, either laparoscopic repair or open repair based on patients choice, surgeons preference and patients fitness for general anesthesia.

Open surgical procedure

Patients who were in open surgical group underwent the surgical procedure under either spinal (majority), spinal plus epidural or general anesthesia. Nasogastric tube and Foley's catheter were inserted in few cases according to the requirement. After induction patients were placed in supine position, parts painted and draped. The choice of skin incision was made according to the site and size of the defect, type of hernia and surgeons preference. After identifying the hernia sac, if there were no adhesions, the sac was dissected off the tissues and reduced into the peritoneal cavity.

When there were adhesions, sac was opened and contents were released and reduced. Once hernia is reduced, a polypropylene mesh is placed either in the preperitoneal, retromuscular, onlay or in the intraperitoneal position depending on the surgeon preference. The mesh is fixed at its four corners with non-absorbable prolene sutures and along the sides. Suction drain was placed in some cases depending on the requirements according to the operating surgeon. Then subcutaneous tissue closed with absorbable sutures and skin closed with staples or non-absorbable sutures.

Laparoscopic procedure

All laparoscopic repairs were performed under general anesthesia. Nasogastric tube and Foley's catheter were inserted

in few cases according to the requirement.

Patient is positioned supine without any tilt. The operating surgeon stands to the left of the patient with the camera assistant on his right or left depending on the location of hernia and the scrub nurse stands to the left side of the patient caudally with instrument table.

After painting and draping pneumoperitoneum is established by open Hasson's technique. First a 10 mm camera port is placed and with carbon dioxide insufflation the intraabdominal pressure is maintained at 12 to 15 mm Hg. Additional 5mm (working) ports are placed depending on the type of hernia under direct vision, usually for midline hernias one 5mm port is placed in the left lumbar region, and the other working port is placed in the left iliac region along the anterior auxiliary line.

Defect is delineated, defect size estimated to know the size of mesh to be placed. Wherever needed Adhesiolysis was done using sharp dissection or monopolar diathermy or harmonic scalpel.

The area to be covered by the mesh is marked after the pneumoperitoneum is released and the sites for transracial sutures were marked orienting the defect at its center. The mesh is inserted through the 10 mm port using a reducer.

Mesh is opened intraperitoneally and anchored to the anterior abdominal wall using absorbable tackers, fired using a specialized gun devise in all the cases. And in few cases the mesh is prepared with delayed absorbable PDS sutures in each corners of the mesh and anchored to anterior abdominal wall using a Cobbler needle and tackers were fired. After confirming haemostasis, the ports are withdrawn under vision. 10 mm port is closed with 2-0 polyglactin. Skin closed with either 3-0 Poliglecaprone or nylon sutures. In all cases a flexible, sterile, composite Physiomesh was used Tackers used in our patients were spiral helix shaped, absorbable. Each fixation device consists of 25 absorbable tacks and the trocar diameter of the fixation device is 5mm.

Results

Table 1: Association between Anesthesia and Surgery (N = 60)

Anesthesia	Open (n=30)	Laparoscopic (n=30)	P Value
GA	3 (10.0)	30 (100.0)	<0.001
Spinal	21 (70.0)	0 (0.0)	
SA+EA	6 (20.0)	0 (0.0)	

In the study it was observed that, 70% of patients in open repair group underwent surgery under Spinal anesthesia, 20% under Spinal and Epidural combined, 3% under General anesthesia. Where as in all the subjects in laparoscopic group the surgery was performed under general anesthesia. This observation was statistically significant with p value of 0.001

Table 2: Association between Mesh Position and Surgery (N = 60)

Mesh Position	Open (n=30)	Laparoscopic (n=30)	P Value
Preperitoneal	17 (56.7)	0(0.0)	<0.001
Retromuscular	9 (30.0)	0(0.0)	
Onlay	2 (6.7)	0(0.0)	
Intraperitoneal	2 (6.7)	30(100.0)	

In the study group who underwent open repair it was observed that in 56.7% subjects mesh was placed Preperitoneally, in 30% mesh was placed Retromuscularly, in 6.7% mesh was placed both onlay and Intraperitoneally. Whereas all the subjects in laparoscopic group mesh was placed intraperitoneally. This observation was statistically significant with p value of 0.001

Table 3: Association between Intraoperative Complications and Surgery

Intraoperative Complications	Open (n=30)	Laparoscopic (n=30)	P Value
None	24 (80.0)	22 (73.3)	0.411
Haemorrhages	5 (16.7)	8 (26.7)	
Bowel Injury	1 (3.3)	0 (0.0)	

In the study who underwent open repair it was observed that intraoperative complications i.e. Haemorrhages and Bowel injury were 16.7% and 3.3% respectively. Whereas in Laparoscopic repair group it was observed that 26.7% of subjects had haemorrhages and none of the patients had bowel injury. This observation was not statistically significant. (p value 0.411).

Table 4: Comparison of Mean Duration of Surgery between Open and Laparoscopic groups.

Variables	Open (n=30) Mean (SD)	Laparoscopic (n=30) Mean (SD)	P Value
Duration of Surgery (in min)	75.8 (30.7)	77.3 (22.4)	0.830

In our study we observed that the mean duration of surgery in open group was 75.8 +/- 30.7 min and in laparoscopic group was 77.3 +/- 22.4 min. Both the groups didn't differ with respect the duration of surgery.

Table 5: Comparison of Mean Duration of Return to work between Open and Laparoscopic Surgery.

Variables	Open (n=30) Mean (SD)	Laparoscopic (n=30) Mean (SD)	P Value
Duration of Return to normal (in Days)	24.8 (6.5)	11.2 (3.5)	<0.001

In our study we observed that mean duration of time taken to return to work (RTW) was 24.8 +/- 6.5 and 11.2 +/- 3.5 days in open and laparoscopic groups respectively. This observation was statistically significant with p value < 0.001.

Discussion

Hernias are one of the common presentations in any surgical clinic, of which ventral hernias comprise second most common variety. Various types of surgical procedures have been described in the past for repair of ventral hernias, among all, mesh repair is the most accepted and feasible technique worldwide. Laparoscopic surgery is a major surgical advance, which through its minimal access nature enables a surgeon to give better outcomes to a patient.

Though laparoscopic surgery has been accepted as the gold standard in many other surgeries, its role in ventral hernia repair is still a matter of debate compared to the available open techniques. The relative advantages of laparoscopic and open ventral hernia repair are usually measured in terms of post-operative pain, intra operative and post-operative complications, duration of hospital stay, recovery and recurrence [6].

In our study, mesh was placed intraperitoneally in all the patients who underwent laparoscopic repair 30 (100%). Whereas in open group, in 17 (56.7%) of subjects mesh was placed in Preperitoneal space, 9 (30%) retromuscular, 2 (6.7%) onlay and 2 (6.7%) subjects had mesh placed in the intraperitoneal position. In the present study we observed that intraoperatively 5 (16.7%) in open group and 8(26.7%) in

laparoscopic group had hemorrhage, whereas bowel injury was seen in 1(3.3%) patient in open group and none seen in laparoscopic group.

In our study, though not significant statistically we observed that the mean duration of surgery was found to be slightly more in laparoscopic group 77.3 minutes compared to open group 75.8 minutes. In an RCT by Holzman *et al.* [7] mean duration of surgical procedure were 98 and 128 minutes respectively. Lomanto *et al.* [8] study showed that mean duration of surgery was 93.3 and 90.6 min in open and laparoscopic groups respectively. And the mean duration of operative procedure was 75 min for open and 86 min for laparoscopic groups according to Misra *et al.* [9] McGreevy *et al.* [10] also showed similar findings.

Conclusion

- In this study mesh was placed in intraperitoneally in all laparoscopic groups. And in open group preperitoneal was the most common position (56.7%), followed by retromuscular (30%) where onlay and intraperitoneal mesh was placed in 6.7% of subjects each.
- In our study Physiomesh was used in all laparoscopic repairs intraperitoneally, and polypropylene mesh in different layers was used in open procedures.
- In this study we observed that, in terms of intraoperative complications, there was no statistically significant difference between two groups. Total 27% of patients had intraoperative hemorrhage, 16% in open and 27% in laparoscopic groups. 1 subject in open group had intraoperative bowel injury, none had it in laparoscopic group.

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