A Comparative Study on Laparoscopic Versus Open Ventral Hernia Repair

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ABSTRACT

Introduction: Ventral hernia occurs through the anterior abdominal wall at any site other than groin. Study aimed to compare laparoscopic and open ventral hernia repair.

Material and methods: This was a comparative study conducted in the Department of General Surgery, Hind Institute of Medical Sciences, Ataria, Sitapur. The study population comprised of the indoor patients undergoing ventral hernia repair. Patients with age 18-70 years. The open surgical operations were performed by the Rives and Stoppa technique using prosthetic mesh i.e. Retro-Rectus mesh repair, whereas the laparoscopic repairs were performed using the intra-peritoneal on lay dual mesh (IPOM) repair technique. Visual analogue score (VAS) was used to assess the postoperative pain.

Results: The mean age of patients of Open and Laparoscopic group was 48.11±12.21 and 50.12±11.02 years respectively. Majority of patients were males in both Open (73.3%) and Laparoscopic (70%) groups. The mean post-operative pain in terms of VAS was significantly (p=0.001) lower among the patients of Laparoscopic repair (3.11±1.12) than Open repair (5.20±1.56). Haematoma formation was in 6.7% patients of Open group and was nil in Laparoscopic group. Seroma formation was in 10% patients of Open group and in 3.3% of Laparoscopic. However, the difference was statistically insignificant (p>0.05). There was no significant (p>0.05) difference in time until resumption of diet and movement between the groups.

Conclusion: Laparoscopic hernia repair is a safe alternative to open hernia repair with a significantly lower postoperative pain provided that enough experience and equipment are present.

Keywords: Hernia, Open repair, Laparoscopic Repair

INTRODUCTION

Ventral hernia are classified into incisional, paraumbilical, umbilical, epigastric, and spigelian hernias. Incisional hernias are a complication of open abdominal surgery. Surgical repair is demanding with the goal of tension free repair. The use of prosthetic mesh has helped in reducing the recurrence rates. Paraumbilical hernias are usually acquired whereas umbilical hernias may be congenital. Epigastric hernia protrudes through linea alba above the umbilicus. Five percent of the population has epigastric hernias. There is a high chance of incarcerations and surgery remains the only cure. Most of the spigelian hernias are acquired and require surgery as the chances of intestinal obstruction are high.[1,2]

In this modern era of surgery, emphasis is on decreasing hospital stay and postoperative morbidity with importance given to cosmesis. Hence, laparoscopic surgery has gained paramount importance due to its minimally invasive technique, decreased hospital stay and better cosmesis. The trend toward minimal access surgery (MAS) has prompted general surgeons to scrutinize all operations towards laparoscopic techniques.[3]

A ventral hernia is defined as a fascial defect located in the abdominal wall. Primary ventral hernias have been classified as umbilical, epigastric, Spighelian and lumber hernias, and secondary ventral hernias are incisional hernias that have developed from previous postoperative scars. Ventral hernia repair is a common surgical procedure. Mostly, ventral hernias are small umbilical and epigastric hernias, but almost 30% of these procedures are incisional hernia repair is and around half of these have been done laparoscopically.[4]

Once the patient develops ventral hernia, it inevitably increases in size with time and surgery becomes more and more difficult and hence the repair should not be delayed. With the increase in the number of abdominal surgeries and the use of various incisions associated with surgeries, there is an increase in the incidence of incisional hernia. The surgeons became aware that certain incisions were followed by increased incidence of incisional hernia, because of this awareness, consideration was given to the choice of incision, suture materials that are being used, type of wound closure etc. Moreover, ventral hernias can become irreducible, obstructed, strangulated due top various reasons which markedly increases the risk to patient's life. The treatment of ventral hernia has evolved over many decades.[5]

The main challenges in hernia management lie in deciding

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the surgical approach and type of repair procedure to perform, that is, laparoscopic or open surgery, anatomical or mesh repair and type of mesh to use, and where to place the mesh to guarantee the strongest possible repair with the least probability of recurrence.[6]

After many years of improvement, laparoscopic ventral hernioplasty is now broadly performed. This may offers benefits for the patients from the use of laparoscopic surgery in which there is less operative time, shorter hospital stay, improved the patient outcome and fewer complications in comparison to open hernia repair.[7] This study was conducted to compare laparoscopic and open ventral hernia repair.

MATERIAL AND METHODS

This was a comparative study conducted in the Department of General Surgery, Hind Institute of Medical Sciences, Ataria, Sitapur. The study population comprised of the indoor patients undergoing ventral hernia repair. Patients with age 18-70 years, given informed written consent, ventral hernia less than 10cm in diameter and undergoing elective surgery for ventral hernia were included in the study. Patients with comorbid conditions who carried a high risk for general anaesthesia especially for laparoscopic ventral hernia repair and patients who presented to acute surgical care unit in view of surgical emergency like acute intestinal obstruction were excluded from the study.

Methods

The open surgical operations were performed by the Rives and Stoppa technique using prosthetic mesh i.e. Retro-Rectus mesh repair, whereas the laparoscopic repairs were performed using the intra-peritoneal on lay dual mesh (IPOM) repair technique.

Under general anesthesia, endotracheal intubation was done for all patients. Foleys catheter was put for all patients with lower abdominal incisional hernia repair and nasogastric tube for upper abdominal hernia repair. Single dose of prophylactic 1st generation cephalosporin antibiotic was given to all patients with ventral hernia one hour before operation.

Open ventral hernia repair technique

Skin incision made according to site and size of defect, subcutaneous flap raised up to 3 to 5 cm around the defect, the hernia sac found, adhesiolysis was done, contents were reduced and the sac was excised. The margins of the sheath were defined for about 3-5 cm from the edge of the defect. The peritoneum and posterior rectus sheath was dissected from the rectus muscle. Polypropylene mesh of appropriate size was placed in a retro muscular fashion, the mesh was fixed to the overlying tissue using 2/0 non-absorbable polypropylene suture. A Suction drain was routinely inserted and repair of the anterior rectus sheath with continuous polypropylene number 1 suture was done and layerwise closure of the wound was done.

Surgical technique of laparoscopic ventral hernia repair

Pneumoperitoneum was established with use of a Veress needle inserted in either the left subcostal space. A direct view trocar was inserted laterally in a window between the iliac crest and costal margin. A 30- degree 10-mm laparoscope was used. Most hernias could be repaired with one 10-mm for telescope another 12-mm port for the stapler and two 5-mm ports placed laterally in the upper and lower quadrant, respectively. Adhesiolysis was performed, and the margins of the defect were clearly delineated. The diameter of the incisional hernia neck was measured; and an appropriately sized composite mesh (proceed mesh® Ethicon Inc.) was used to overlap the defect by nearly 50 mm on all sides. Mesh orientation with non-adhesive surface facing the viscera, Mesh centralization and fixation Using 4 long transfascial polypropylene 1/0 suture, marginal sutures to permit adequate orientation followed by placement of a multiple absorbable tacks (AbsorbaTack™, Covidien).

Visual analogue score (VAS) was used to assess the postoperative pain.

STATISTICAL ANALYSIS

The results are presented in frequencies, percentages and mean±SD. The Chi-square test was used to compare categorical variables and Unpaired t-test was used to compare continuous variables. The p-vale<0.05 was considered significant. All the analysis was carried out on SPSS 16.0 version (Chicago, Inc., USA).

RESULTS

The mean age of patients of Open and Laparoscopic group was 48.11±12.21 and 50.12±11.02 years respectively. Majority of patients were males in both Open (73.3%) and Laparoscopic (70%) groups. However, there was no significant (p>0.05) difference in age and sex between the groups showing comparability of the groups in terms of age and sex (Table-1).

The mean post-operative pain in terms of VAS was significantly (p=0.001) lower among the patients of Laparoscopic repair (3.11±1.12) than Open repair (5.20±1.56). Haematoma formation was in 6.7% patients of Open group and was nil in Laparoscopic group. Seroma formation was in 10% patients of Open group and in 3.3% of Laparoscopic. However, the difference was statistically insignificant (p>0.05). Surgical site infection was in 3.3% patients of Open group and was nil in Laparoscopic group. However, the difference was

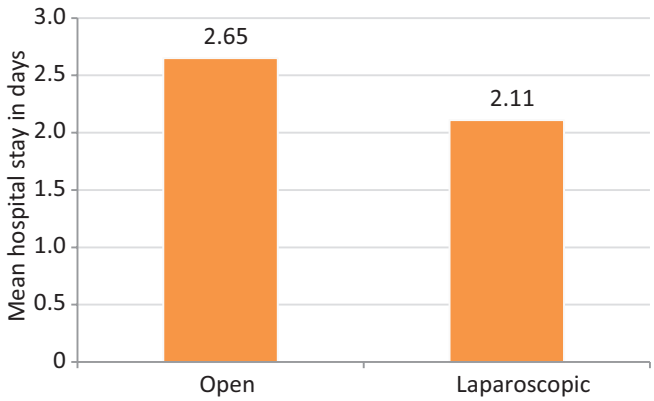

Figure-1: Comparison of duration of hospital stay in days (p=0.)

	Open repair (n=30)	Laparoscopic repair (n=30)	p-value[1]
Age in years, mean±sd	48.11±12.21	50.12±11.02	0.51
Sex, no. (%)			
Male	22 (73.3)	21 (70.0)	0.77
Female	8 (26.7)	9 (30.0)	
[1]Unpaired t-test/Chi-square test			

Table-1: Age and sex distribution of patients studied

	Open repair (n=30)	Laparoscopic repair (n=30)	p-value[1]
Pain (VAS), mean±sd	5.20±1.56	3.11±1.12	0.001*
Haematoma formation, no. (%)			
Yes	2 (6.7)	0 (0.0)	0.47
No	28 (93.3)	30 (100.0)	
Seroma formation, no. (%)			
Yes	3 (10.0)	1 (3.3)	0.60
No	27 (90.0)	29 (96.7)	
Surgical site infection, no. (%)			
Yes	1 (3.3)	0 (0.0)	.031
No	29 (96.7)	30 (100.0)	
MESH infection, no. (%)			
Yes	0 (0.0)	0 (0.0)	-
No	30 (100.0)	30 (100.0)	
Recurrence			
Yes	0 (0.0)	0 (0.0)	-
No	30 (100.0)	30 (100.0)	
[1]Unpaired t-test/Chi-square test, *Significant			

Table-2: Comparison of post-operative outcomes between the groups

Time	Open repair (n=30)	Laparoscopic repair (n=30)	p-value[1]
Time until Resumption of Diet in hours	1.04±0.20	1.12±0.44	0.36
Time until Resumption of movement in hours	1.01±0.30	1.10±0.51	0.40
[1]Unpaired t-test, *Significant			

Table-3: Comparison of time until Resumption of Diet and movement between the groups

statistically insignificant (p>0.05). There was no mesh infection in both the groups. The recurrence was also nil in both the groups (Table-2).

There was no significant (p>0.05) difference in time until resumption of diet and movement between the groups (Table-3).

The mean length of hospital stay was almost similar (p>0.05) in both the groups (Fig.1).

DISCUSSION

In comparison with open incisional hernia surgery, laparoscopic incisional hernia repairs have many advantages such as, a lower incidence of surgical site infection, decreased hernia recurrence and shorter length of stay. It also had a number of disadvantages such as the longer operative times, the high costs of the equipment's, laparoscopic tools and mesh used. The two techniques differ in two significant aspects in that LIHR is often performed without primary fascial closure and LIHR is invariably performed with intraperitoneal mesh.[8-10]

This study found that the mean age of Open and Laparoscopic group was 48.11±12.21 and 50.12±11.02 years respectively. In the study by Mohamed and Abdelmgeed[11], the mean age was 46.94±8.08 and 45.69± 7.66 years in Open and Laparoscopic group respectively. Rubby et al[5] found in their study that youngest age was 27 years and the oldest patient was 75 years. Majority of patients in this study were males in both the groups. In the study by Mohamed and Abdelmgeed[11], male-female ratio was 16/15 in Open group and 20/9 in Laparoscopic group. Rubby et al[5] found in their study that majority (50%) of the patients were in the 4th to 6th decade.

This study observed that the mean post-operative pain was lower in patients of Laparoscopic group compared to Open group. This finding was in agreement with the study by Rubby et al[5] who found in their study that the post-operative pain open group was 3.80 and in laparoscopic group was 2.35 with significant difference (p=0.0005). There was no conversion of Laparoscopic to Open Surgery in the current

study. McGreevy et al[12] conducted a study and found that of the 136 ventral hernia repairs that met the study criteria, 65 (48%) were laparoscopic repairs (including 3 conversions to open surgery) and 71 (52%) were open repairs. Bingener et al[13] found conversion rate being 4%.

In this study, haematoma formation was in 6.7% patients of Open group and was nil in Laparoscopic group. Seroma formation was in 10% patients of Open group and in 3.3% of Laparoscopic. Forte et al[14] found 7 cases of seroma/ hematoma (2.4%). Zhang et al[15] reported that there were no significant differences between the two groups in the incidences of hernia recurrence, postoperative seroma, hematoma, bowel obstruction, bleeding, and reoperation. In the study by Mohamed and Abdelmgeed[11], seroma formation was 6/29 (20.7%) in Laparoscopic group and 5/31 (16.1%) in open group with no significant difference.

In the current study, there was no mesh infection in both the groups. The recurrence was also nil in both the groups. Surgical site infection was in 3.3% patients of Open group and was nil in Laparoscopic group. Mohamed and Abdelmgeed[11] found no Mesh infection in Laparoscopic group and in 1/31(3.2%) patients in Open group. Thota et al[3] found that there were no cases of mesh infection or recurrence with a mean follow-up of 12 months in both Open and Laparoscopic group. Rubby et al[5] found in their study that patients operated with laparoscopy returned to daily activities within 10 days of surgery, whereas it took 22 days for the patients in open group.

The mean length of hospital stay was almost similar ($p>0.05$) in both the groups in this study. Mohamed and Abdelmgeed[11] reported that the most significant difference between both group were the hospital stay which were shorter in laparoscopic incisional hernia repair and wound related complication which was also lower in laparoscopic incisional hernia repair. However, similar to the finding of this study, Chalabi et al[16], in their review of literature and meta-analysis reported that no evidence to support one procedure over the other. Laparoscopic repair had been proven to be as effective and safe as open repair. The findings from the Meta-analysis showed no difference between the two procedures as regard length of hospital stay, hernia recurrence and operative time. However, it had been shown that the laparoscopic technique was associated with less wound infections than the open repair.

Laparoscopic surgery is generally associated with reduced pain as reinstated by this study. Three RCTs[17-19] reported equal incidence of postoperative pain scores in both the groups. Almost all the RCTs except Asencio et al[17] reported decreased wound related complications with laparoscopy. Among all, the most common complications are seroma and wound infection. Seroma rates are higher in laparoscopy in earlier studies, whereas Itani et al[20] reported lower seroma rates in laparoscopy. Wound infection was higher in open group in all the studies.

One of the limitations of this study was small sample size. Another limitation is the lack of long-term follow-up. Without long-term follow-up, we cannot confirm the recurrence rate of both the groups. More elaborate clinical studies are indicated to elucidate this issue.

CONCLUSION

Laparoscopic hernia repair is a safe alternative to open hernia repair with a significantly lower postoperative pain provided that enough experience and equipment are present. However, there is need of large randomized controlled trail study in the future to detect this advantage as this study was small non-randomized study.

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